WEST VIRGINIA UNIVERSITY

1973-74 Undergraduate Catalog

A modern rapid transit system under construction will connect West Virginia University's campuses. The internationally unique system will consist of a 3.6-mile guideway and about 80 cars that will carry 8 seated and 13 standing passengers each. Peak capacity will be 1,100 people in 20 minutes. The system not only will serve WVU's rapid transit needs, but it is attracting the attention of engineers and researchers from countries that face similar transportation problems. These pictures show the Engineering Station on Evansdale Campus (above) and the guideway (below) running from Evansdale to the WVU Downtown Campus. The system is being financed largely by the U. S. Department of Transportation as a research and demonstration project.

WEST VIRGINIA UNIVERSITY

1973-74 Undergraduate Catalog

CORRESPONDENCE

Address as follows:

ADMISSIONS AND RECORDS
Dean of Admissions and Records

HOUSING
Director of Housing

EMPLOYMENT
Personnel Office

LOANS, SCHOLARSHIPS, VETERANS
Financial Aids Office

WORK-STUDY
Financial Aids Office

STUDENT LIFE
Dean of Student Educational Services

POTOMAC STATE COLLEGE
Registrar and Director of Admissions
Keyser, W. Va. 26726

MATTERS OF GENERAL UNIVERSITY INTEREST
The President

WEST VIRGINIA UNIVERSITY
MORGANTOWN, W. VA. 26506

WEST VIRGINIA UNIVERSITY BULLETIN
Series 73, No. 11-1, May, 1973

The West Virginia University Bulletin is issued Monday, Wednesday, and Friday throughout the year. Publications included are College of Law Catalog, Medical Center Catalog, Graduate School Catalog, Summer Session Bulletin, this Catalog; bulletins of the College of Engineering and the School of Mines; and other scholarly and scientific publications.

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UNIVERSITY CALENDAR 1973 – 1974

1973—First Semester

August 19, Sunday, to August 21, Tuesday, incl. ..... Freshman-Transfer Orientation
August 20, Monday ..... General Registration
August 21, Tuesday ..... General and Freshman Registration
August 22, Wednesday ..... First Day of Classes
September 3, Monday ..... Labor Day Recess
October 9, Tuesday ..... Faculty Assembly Meeting
October 13, Saturday ..... Mid-Semester
October 19, Friday ..... Mid-Semester Reports Due
November 21, Wednesday, to November 25, Sunday, incl. ..... Thanksgiving Recess
December 7, Friday ..... Last Classes, First Semester
December 10, Monday, to December 15, Saturday, incl. ..... Final Examinations
December 16, Sunday, to January 6, Sunday, incl. ..... Christmas Recess

1974—Second Semester

January 7 and 8, Monday and Tuesday ..... General Registration, Second Semester
January 9, Wednesday ..... First Classes, Second Semester
February 7, Thursday ..... West Virginia University Day
February 18, Monday ..... Washington's Birthday Recess
February 28, Thursday ..... Mid-Semester
March 2, Saturday, to March 10, Sunday, incl. ..... Spring Recess
March 11, Monday ..... Mid-Semester Reports Due
April 9, Tuesday ..... Faculty Assembly Meeting
April 15, Monday ..... Easter Recess
May 3, Friday ..... Last Classes, Second Semester
May 6, Monday, to May 11, Saturday, incl. ..... Final Examinations
May 13, Monday ..... Grade Reports for Graduating Seniors and Graduate Students Due in Deans' Offices
May 14, Tuesday ..... Deans' Reports of Graduates Due in Office of Admissions and Records
May 18, Saturday ..... Alumni Day
May 19, Sunday ..... Commencement

It is the policy of West Virginia University to provide equal opportunities to all prospective and current members of the student body, faculty, and staff on the basis of individual qualifications and merit without regard to race, sex, religion, age, or national origin.

The University also neither affiliates with nor grants recognition to any individual, group, or organization having policies that discriminate on the basis of race, sex, religion, age, or national origin.

WEST VIRGINIA BOARD OF REGENTS

1316 Charleston National Plaza Charleston, W. Va. 25301

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Okey L. Patteson, *Vice-President*, 1972-73, Mount Hope
Mrs. Elizabeth H. Gilmore, *Secretary*, 1972-73, Charleston
John E. Amos, Charleston
Earle T. Andrews, Berkeley Springs
Amos A. Bolen, Huntington
Edward H. Greene, Huntington
Albert M. Morgan, Morgantown
Frederick P. Stamp, Jr., Wheeling
Daniel B. Taylor, ex officio, Charleston

Prince B. Woodard, *Chancellor*, Charleston

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Office of the President Morgantown, W. Va. 26506

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Leslie C. Gates, Beckley
Robert E. Mentzer, Weirton
Richard A. Raese, Morgantown
Fred R. Toothman, Huntington
Dr. A. J. Villani, Welch
Harold J. Shamberger, *Secretary*

James G. Harlow, *President*

Programs to Be Terminated

In December, 1972, the West Virginia Board of Regents directed that no new students will be admitted to the following programs, although students enrolled in them by the 1972-73 academic year will be given adequate time to complete their degree objectives:

Baccalaureate Level Majors

Engineering (Five-Year Curricula)
Forest Science
Industrial Management
Plant Science

Master's Level Majors

Entomology
Library Science
Microbiology, Agricultural
Philosophy
Plant Physiology
Safety
Wood Science Technology

Doctoral Level Majors

Educational Psychology
Plant Physiology
Safety Education

WEST VIRGINIA UNIVERSITY

Office of the President

President, James G. Harlow, Ph.D.
Vice-President—Administration and Finance, Harry B. Heflin, Ph.D.
Provost—Health Sciences, Charles E. Andrews, M.D.
Provost—Instruction, Jay Barton, II, Ph.D.
Provost—Off-Campus Education, Ralph E. Nelson, Ph.D.
Provost—Planning, Raymond M. Haas, D.B.A.
Provost—Research and Graduate Studies, Ray Koppelman, Ph.D.
Executive Assistant to the President, Harold J. Shamberger, M.P.A.
Assistant to the President, Londo H. Brown, LL.M.
Assistant to the President—Communications, Harry W. Ernst, M.S.J.
Assistant to the President—Grants and Contracts, George E. Kirk, M.B.A.
Assistant to the President—Rapid Transit System, Samy E. G. Elias, Ph.D.
Administrative Assistant, Mary A. McDaniel, M.A.
Administrative Assistant, Wilma G. Starkey
Executive Secretary to the President, Edith I. Kelley
Internal Auditor, S. A. Cunningham, B.S., C.P.A.
Ombudsman, Stacy L. Groscup, M.Div.

Deans

Admissions and Records, John D. Brisbane, Ed.D.
Agriculture and Forestry/Agricultural Experiment Station, Robert S. Dunbar, Jr., Ph.D., Dean and Director
International Programs, Newton M. Baughman, Ph.D., Director
Appalachian Center, B. L. Coffindaffer, Ph.D., Dean and Director
Division of Extension Credit and Non-Credit Programs, Edsel Gainer, Ed.D., Director
Cooperative Extension Service, Ronald L. Stump, M.S., Associate Director
Arts and Sciences, John C. Wright, Ph.D.
Bureau for Government Research, Orrin B. Conaway, Jr., Ph.D., Director
Business and Economics, Jack T. Turner, D.B.A.
Bureau of Business Research, Dennis R. Leyden, B.S., Director
Creative Arts Center, Richard E. Duncan, Ph.D., Dean and Director
Dentistry, W. Robert Biddington, D.D.S.
Engineering, Chester A. Arents, M.E., Dean and Director
Engineering Experiment Station, William R. Boyle, Ph.D., Assistant Director
Graduate, Stanley Wearden, Ph.D.
Human Resources and Education, William G. Monahan, Ed.D.
Journalism, Guy H. Stewart, Ph.D.
Law, Willard D. Lorensen, J.D.

Medicine, Frank W. McKee, M.D.
Charleston Division, WVU Medical Center,
Hartwell G. Thompson, M.D., Dean
Mines, Jay Hilary Kelley, Ph.D.
Coal Research Bureau, Joseph W. Leonard, M.S., Director
Nursing, Lorita D. Jenab, Ed.D.
Pharmacy, Frank D. O'Connell, Ph.D., Acting Dean
Physical Education, C. Peter Yost, Ph.D.
Potomac State College, Harold C. Doster, Ph.D.
Social Work, Leon H. Ginsberg, Ph.D.
Student Educational Services, Joseph C. Gluck, M.Div.
Counseling Service, James F. Carruth, Ph.D., Director
Financial Aids, Neil A. Bolyard, M.A., Director
Health Service, Charles E. Andrews, M.D., Acting Director
Placement Service, M. Cornelia Ladwig, Ph.D., Director
Residence Halls Programs, Betty Boyd, A.B., Director

Directors

Air Force Aerospace Studies (ROTC), Col. Howard A. Thornhill, M.S.
Alumni Association, David W. Jacobs, A.B.
Book Store, Ruth E. Robinson, A.M.
Budget Office, Richard M. Gardner, M.B.A.
Comptroller, William H. McMillion, M.S.
Computer Center, Wayne A. Muth, Ph.D.
Development Office, Donovan H. Bond, M.A.
Housing, Robert A. Robards, B.S.
Intercollegiate Athletics, Leland E. Byrd, Ed.D.
Libraries, Robert F. Munn, Ph.D.
Military Science (ROTC), Col. Duquesne A. Wolf, M.S.
Mountainlair, Edwin W. Reynolds, M.A.
Parking, Motor Pool, Bus and Mail Services, Eugene F. Powell, Manager
Personnel, S. Thomas Serpento, M.A.
Physical Plant, Vergil B. Clark, M.S.
Purchasing and Inventory, James C. Reed
Radio, Television and Motion Pictures, C. Gregory Van Camp, M.S.J.
Regional Research Institute, William H. Miernyk, Ph.D.
Security Police, Kenneth B. Johnson
University Hospital, Eugene L. Staples, M.H.A.
Nursing Service, Audrey E. Windemuth, M.N.A.
University Relations, Harry W. Ernst, M.S.J.
Publications, John Luchok, B.S.J., University Editor

Part 1
GENERAL INFORMATION

West Virginia University, which was founded on February 7, 1867, combines into a single institution the functions of a state university and a state land-grant university—functions assigned to two or more institutions in many states. Thus the range and variety of instructional, research, and off-campus programs at WVU are greater than at many institutions its size.

The primary mission of the University within the West Virginia system of higher education is to serve as the center for graduate and professional training, research, and extension education. WVU's total statewide enrollment was more than 20,000 persons for the First Semester of the 1972-73 academic year, including 3,969 graduate and professional students at Morgantown, 742 freshmen and sophomores at Potomac State College in Keyser, and 1,916 persons in extension credit classes throughout the state.

The major academic divisions of the University are: College of Agriculture and Forestry; Creative Arts Center; School of Dentistry; College of Engineering; Graduate School; College of Human Resources and Education; School of Journalism; College of Law; School of Medicine; Division of Military Science (ROTC) and Division of Air Force Aerospace Studies (ROTC); School of Mines; School of Nursing; School of Pharmacy; School of Physical Education; and School of Social Work.

West Virginia University is a member of the North Central Association of Colleges and Secondary Schools. All of the University's educational programs are fully accredited by the North Central Association and by the appropriate accreditation agencies for the professional schools.

The academic year is divided into two semesters of approximately seventeen weeks each and a Summer Session of nine weeks.

West Virginia University's growth in physical facilities since 1958 has been equaled by few universities of its size in the nation. During that time more than $100 million in new buildings and facilities either have been built or are under construction in Morgantown.

They include a $10.8 million Creative Arts Center; engineering and agriculture buildings costing $10 million; the $33 million Medical Center complex; $18.4 million in residence halls and apartments; a $5.4 million forestry building and tower; $4 million in chemistry facilities; a $10.5 million Coliseum; and the $6.7 million campus activities center (Mountainlair) with its adjoining plaza and parking garage. A College of Law building is under construction near the Medical Center.

The campuses in Morgantown contain 57 buildings on 610 acres. A University-operated, inter-campus bus system connects the campuses and an internationally unique Personal Rapid Transit System—featuring small automated cars operated by a system of computers—is under construction between downtown Morgantown and the campuses. The system is being built by the U. S. Department of Transportation as a research and demonstration project.

WVU operates nine experiment farms in Hardy, Jefferson, Mason, Monongalia, Preston, Randolph, and Wetzel counties; a biological station near Terra Alta; a geology camp near White Sulphur Springs; and State 4-H facilities at Jackson's Mill. The University also is involved in an agricultural education and research program in East Africa, which is financed by the U. S. Agency for International Development, and a federally-funded Regional Medical Program serving West Virginia.

WVU's Center for Appalachian Studies and Development, organized in 1963, has pioneered nationally in broadening the role of the federally funded Cooperative Extension Service from strictly agricultural education to community development. The Appalachian Center takes expertise to the people through six area centers and offices in all of West Virginia's fifty-five counties.

Potomac State College of West Virginia University at Keyser is a junior college offering two-year programs. Its transfer programs, designed to conform to the lower division of WVU, provide the freshman and sophomore years in the liberal arts and sciences (humanities, natural and physical sciences, and social sciences) and in the following pre-professional studies: agriculture, commerce, computer science, dentistry, education, engineering, forestry, home economics, journalism, law, medicine, medical technology, nursing, pharmacy, physical education, physical therapy, and social work.

Occupational programs and technologies include accounting, agriculture, computer programming, engineering, and secretarial studies. Students who successfully meet the requirements of these programs are granted an Associate in Arts degree.

Potomac State College traces its origin to a 1901 Act of the West Virginia Legislature. From 1902 to 1921 the institution functioned as a secondary school in an area of West Virginia where few public high schools existed. In 1921, because appreciable numbers of high schools had been opened, the Legislature changed the name to "Potomac State School," a junior college offering the first two years of a standard collegiate program and certain vocational studies. By a 1953 Act, the name was changed from school to college.

The Legislature placed Potomac State under the WVU Board of Governors in 1935. Since 1969 both institutions have been governed by the West Virginia Board of Regents.

Potomac State College, with over $4 million in new buildings constructed since 1951, has been fully accredited by the North Central Association of Colleges and Secondary Schools since 1926.

Further information may be obtained by writing: The Dean, Potomac State College, Keyser, W. Va. 26726.

GOVERNMENT AND ORGANIZATION OF WVU

The West Virginia Board of Regents is vested by law with authority for the control and management of the University and all other state institutions of higher education. Serving on the Board are nine members appointed by the Governor with advice and consent of the Senate and the State Superintendent of Schools, an ex officio member. The seven members of the West Virginia University Advisory Board are appointed by the Board of Regents to serve as consultants to the President.

The President, appointed by the Board of Regents, is the chief executive officer of the University as well as its principal academic officer, a role which his position as presiding officer of the University Senate symbolizes. The President's Office staff includes the vice-president, provosts, and assistants to the president.

The University Senate is the vehicle for faculty participation in the government of the University. It is a legislative body with original jurisdiction over all matters of academic interest and educational policy that concern the entire University or affect more than one college, school, or division. The Senate's decisions are subject to review and approval by the President and the Board of Regents. The Senate includes the President of the University as chairman, Provosts, Academic Deans, five administrative officers appointed by the President, and Senators elected by members of the University Faculty Assembly to represent their college and other constituencies. Each constituency is entitled to one Senator for each twenty constituents who are members of the University Faculty Assembly. The Senate normally meets once each month.

The University Faculty Assembly includes the President of the University as presiding officer, Provosts, Academic Deans, Professors, Associate Professors, Assistant Professors, and Instructors holding appointments on a full-time basis, and such other persons engaged in full-time professional activities responsive to the academic obligations of the University. The Faculty Assembly normally meets twice a year.

West Virginia University also has a tradition of strong *student government* that touches all aspects of student life and represents student opinion to the administration and faculty. A total of 95 students serve on 39 University committees including the Committee on Student Discipline (two student members and three faculty members) and the Mountainlair Advisory Council (four students and four faculty members).

MORGANTOWN AREA

West Virginia University is located in the heart of the Appalachian Mountains, which are among the oldest and contain the world's greatest hardwood forest that begins in Southern West Virginia. Morgantown has a population of 29,000; Monongalia County, 64,000. Monongalia is one of the largest deep-mine coal-producing counties in the nation, with production exceeding 10 million tons annually. WVU is the largest single employer.

Located on the east bank of the Monongahela River, which flows north to Pittsburgh, Morgantown is situated on rugged terrain of the Appalachian Highlands. The altitude of the city varies from 800 to 1,150 feet above sea level, while the surrounding hills rise eastward to Chestnut Ridge which has altitudes of 2,600 feet just 10 miles from the city.

The area's temperate climate is marked by four distinct seasons of about equal length. Morgantown's valley location allows it to usually escape the extremes of winter—downtown snowfall averages only 25 inches annually and cold waves, which average about three a year, are blunted by the hilly terrain. Heavy winter clothing isn't usually needed until after Thanksgiving.

Morgantown is served by bus and by Allegheny Airlines.

U. S. Routes 19 and 119 pass through Morgantown in the north-south direction. Pittsburgh is 70 miles north. The cities of Charleston, W. Va., Washington, Baltimore, Cleveland, and Columbus, Ohio, all lie from 190 to 220 miles distant. A north-south interstate highway, I-79, is being constructed to pass just west of Morgantown.

Because of WVU's intellectual resources, the Morgantown area is becoming the major research center in the Appalachian region. Four federal agencies have located research facilities in the area—the Department of Health, Education, and Welfare (the Appalachian Center for Occupational Safety and Health), the Forest Service (the Forestry Sciences Laboratory), the Morgantown Energy Research Center of the U. S. Bureau of Mines, and the Soil Conservation Service (West Virginia headquarters). The American Association of Cost Engineers also recently moved its national headquarters to Morgantown primarily because of WVU's computer and other resources.

Two installations add to the area's variety. They are the Robert F. Kennedy Youth Center, a model rehabilitation facility for youths who violate federal laws, and an earth tracking station of the Communications Satellite Corporation in neighboring Preston County (its 97-foot antenna sends and receives world-wide telephone and other communications from satellites in outer space).

Part 2
ADMISSION, FEES, REGISTRATION, REGULATIONS

ADMISSION FROM SECONDARY SCHOOLS

Students may be considered for admission to West Virginia University on the basis of graduation and transcripts from accredited high schools. High school graduates are required to present credit for 4 units of English and 1 unit of algebra. In addition, agriculture, chemistry, forestry, geology, mathematics, physics, and the health sciences require 1 unit of geometry. Engineering and mining majors are required to present 2 units of algebra, 1 unit of geometry and ½ unit of trigonometry, or its equivalent. Students who do not meet these requirements in mathematics may apply for admission to the pre-engineering curriculum.

All students entering as first-term freshmen are required to take the American College Testing Program tests (ACT) and have the report of scores sent to the University. This test is not used for admission, but for placement, and no other test may be substituted for it.

Students from West Virginia high schools should obtain applications for admission from their high schools. Out-of-state students may write the WVU Office of Admissions and Records and request an application form. Applicants should prepare their part of the application and then return it to their secondary school. The school will then send the completed application and a transcript of high school grades directly to Office of Admissions and Records.

Students interested in financial assistance must file a Parents Confidential Statement with College Scholarship Service, Midwest Regional Office, 990 Grove Street, Evanston, Illinois 60201. Forms are available at your high school or from College Scholarship Service. Submit only forms dated for the current academic year.

Students should apply for admission when they have met these requirements:

West Virginia Residents

1. If, after 6 semesters of secondary school, the student has a grade-point average of 2.5 of a possible 4.0 (C+ or above), he should apply as soon as possible after September 15.

Non-academic policies and regulations affecting students are summarized in the *Student Handbook*. Every student is urged to obtain a copy of the *Handbook* from the Office of Student Educational Services, 109 Martin Hall.

2. If, after 7 semesters of secondary school, the student has a grade-point average of 2.0 of a possible 4.0 (C or above), he should apply as soon as possible after beginning the 8th semester.

3. If the student has a grade-point average of 2.0 of a possible 4.0 (C average) at graduation, he should apply immediately after graduation from the secondary school.

4. Return the application to your secondary school. The school will complete the confidential report and mail the application, the computer sheet, and a copy of your high school transcript to the WVU Office of Admissions and Records. If you are applying on the basis of your GED examination, an official copy of your test scores and diploma must be sent to the Office of Admissions and Records.

Out-of-State Residents

1. If, after 6 semesters of secondary school, the student has a grade-point average of 3.0 of a possible 4.0 (B or above), he should apply as soon as possible after September 15.

2. If, after 7 semesters, the student has a grade-point average of 2.5 of a possible 4.0 (C+ or above), he should apply as soon as possible after the beginning of the 8th semester.

3. If the student has a grade-point average of 2.0 of a possible 4.0 (C average) at graduation, he should apply immediately after graduation from secondary school.

4. Return the application to your secondary school. The school will complete the confidential report and mail the application, the computer sheet, and a copy of your high school transcript to the Office of Admissions and Records, WVU. If you are applying on the basis of your GED examination, an official copy of your test scores and diploma must be sent to the Office of Admissions and Records.

CEEB Advanced Placement Program

WVU encourages students to work to their capacity and to advance as rapidly as appropriate in their academic work. Therefore, qualified juniors and seniors who take college level subjects offered in their schools in cooperation with the CEEB Advanced Placement Program should take the appropriate three-hour examinations administered by the Advanced Placement Service and have the scores and tests sent to WVU. Credit for corresponding WVU courses is automatically given for high achievement in these tests.

Students may petition departments to take placement examinations, after they have registered, covering courses offered at WVU. Credit or advanced placement is given for satisfactory completion of these tests.

ADMISSION OF TRANSFER STUDENTS

Applicants for transfer from another college or university should submit the following to the Office of Admissions and Records:

1. A complete application for undergraduate admission.
2. A certified transcript of all college work taken to date, including a

statement of good standing. A certified statement covering subjects subsequently taken should be sent as soon as it is available.

3. Catalog pages describing all subjects which have or will have been completed. The applicant's name should be written on each page and each subject indicated by a check mark in the margin. Complete catalogs should not be sent. (Not necessary from West Virginia colleges.)

The cumulative average of all work attempted before transfer must be at least C.

Credits and grades earned for all baccalaureate level courses at any baccalaureate degree-granting institution in the West Virginia state system of higher education and up to 72 hours of credits and grades earned for college-parallel courses completed at community colleges or branch colleges in the West Virginia state system shall be transferable toward a bachelor's degree. (See also "Requirements As to Residence," page 38.)

Credits (though not grades) are transferable from institutions outside the West Virginia state system for courses carrying a grade of C or higher. A grade of D on the first of sequence courses may be transferred if the second course grade is C or higher.

Credits from two-year community colleges and junior colleges outside the West Virginia state system are limited to 72 hours of lower-division courses. These colleges must be accredited by the North Central Association of Colleges and Secondary Schools or another regional accrediting association.

The transfer of credits does not exempt the student from satisfying all the requirements for his degree program at WVU.

An average of 2.0 on all mathematics courses completed is required for transfer into the College of Engineering or School of Mines.

All transcripts must be in the Office of Admissions and Records three weeks in advance of registration.

Evaluation of transcripts for transfer of credit is furnished only after receipt of complete official transcripts and application for admission.

Transfer students generally are admitted only after they complete one full year at another institution. Applicants who have less than one full year of college work elsewhere must submit both their college and high school records. Students who have successfully completed 6 hours or less at another accredited institution will apply as freshmen.

ADMISSION OF SPECIAL STUDENTS

Persons not desiring to become candidates for a degree may, by special permission, be admitted as special students. Such students are subject in all respects to the usual rules relating to registration and scholarship. Admission to any class is subject to the approval of the instructor in charge.

Students who do not plan to follow a degree program at WVU should submit only a statement of good standing from the last college attended.

ADMISSION OF FOREIGN STUDENTS

Foreign citizens applying for undergraduate entrance must have their completed application available for review at least four months before the

date of enrollment. Decisions about admission cannot be made until complete records have been received. Inquiries and application should be addressed to the Office of Admissions and Records.

Students applying as undergraduates should have completed the equivalent of a secondary education and ranked higher than average in their class.

Students with a native language other than English are required to take the Test of English As a Foreign Language (TOEFL). Applications for the test should be addressed to: TOEFL, Educational Testing Service, Princeton, New Jersey 08540.

Preliminary applications, prepared by the Institute of International Education, are available at United States consulates and United States Information Agency offices.

Foreign students should make all arrangements for their financial obligations to WVU and for their entire stay in the United States before leaving their countries.

READMISSION

Undergraduate students who leave the University for at least one complete semester are required to submit an application for readmission to the Dean of Admissions and Records.

Students who have been suspended from the University must have written approval from the dean of the school or college from which the student was suspended.

Approval in writing must be secured in advance to elect courses offered elsewhere. An overall average of C is required on all work completed at WVU in order to obtain such approval. Credit will be accepted for transfer for courses carrying a grade of C or higher when the conditions indicated above have been met.

Students wishing to change their major upon readmission must have permission from their previous dean and the dean of the college to which they wish to transfer.

INTRAUNIVERSITY TRANSFERS

Students transferring from Potomac State College of WVU shall be considered intrauniversity transfers. All records made at Potomac State are part of the student's University record, but no more than 72 hours may be applied toward the baccalaureate degree.

If a change of major is involved, the transferee should consult the college or department to which he is transferring concerning requirements for his new major.

ADVANCED STANDING EXAMINATION

Application for advanced standing on work of college grade for which college credit cannot be established on the basis of official transcript of record should be made to the Dean of Admissions and Records. Upon payment of the proper fee the Dean of Admissions and Records will issue an examination permit. After examination, the department will report to the Dean of Admissions

and Records those courses, if any, for which the applicant is entitled to credit. Credit shall be certified only for C or higher rating and "No Credit" for any lower rating.

VETERANS

Veterans may be admitted to WVU with less than the minimum admission requirements necessary for other, non-veteran, applicants.

Information regarding educational opportunities made possible at the University through provisions of the Veterans Readjustment Benefits Act of 1966–G.I. Bill (Public Law 358), the Vocational Rehabilitation Program of the Veterans Administration (Public Law 16), and the War Orphan's Educational Assistance Act of 1956 (Public Law 634) may be obtained from the Veterans Coordinator by personal conference or by mail. An amendment to Public Law 634, passed by Congress in 1964, provides benefits to many dependents of 100 per cent disabled veterans.

Veterans having at least one continuous year of military service may be exempted from the Physical Education general program. No scholastic credit is given. Present proof of military service to the Dean of Admissions and Records.

COLLEGE OF BUSINESS AND ECONOMICS

Applicants seeking admission to the College of Business and Economics for the purpose of obtaining a degree must have earned at least 58 semester hours of required and approved elective courses in the Pre-Business and Economics curriculum at a grade average of not less than C. No student will be admitted who has not completed Economics 51, 52, and 125, and Accounting 51. Freshmen and sophomores are enrolled as Pre-Business and Economics students in the College of Arts and Sciences where their programs of study will be directed by Pre-Business and Economics advisers.

High school graduates interested in professional programs in business administration and economics must meet the minimum requirements for admission to WVU. Prospective students should file applications with the Dean of Admissions and Records and stipulate the "Pre-Business and Economics Programs."

CREATIVE ARTS CENTER

Placement tests and auditions or a portfolio of the student's art work may be requested for admission to the Creative Arts Center (Music, Art, Drama).

Students transferring to the Creative Arts Center from other colleges and schools will be required to present a minimum grade-point average of 2.0. Exceptions may be made in the case of first-semester freshmen.

Advanced standing in the Division of Music in Applied Music and Music Theory is given only by examination.

SCHOOL OF DENTISTRY

Applicants for admission to the School of Dentistry, who have completed undergraduate requirements, should write the Office of Admissions and Re-

cords, WVU Medical Center, which will furnish official blanks upon which formal application must be made.

A $10.00 application fee is required and must accompany the application.

Applicants must present evidence of having completed successfully three full academic years (exceptional two-year applicants may be considered) of work in the liberal arts in an accredited college based on the completion of the prescribed four-year high school course. All science courses shall include both lecture and laboratory instruction. The college courses shall include not less than 6 semester hours credit in English composition and rhetoric, and 8 credit hours each in biology (preferably zoology), physics, inorganic chemistry, and organic chemistry.

A dental aptitude testing program is sponsored by the Council on Dental Education of the American Dental Association and approved by the American Association of Dental Schools. Applicants for admission to the School of Dentistry are required to take the aptitude tests and to submit the resulting scores. These scores will be considered as a factor in the selection of students. The tests may be taken in any one of the dental schools, or any one of the testing centers set up in colleges and universities throughout the United States. Information concerning the places, and the dates on which the test will be given, may be obtained from the Secretary of the Council on Dental Education, Division of Educational Measurements, American Dental Association, 221 East Chicago Avenue, Chicago, Illinois 60611.

A personal interview with the Committee on Admissions is required. Interviews will be at the WVU Medical Center, and will be arranged, as far as possible, to suit the convenience of the applicant.

Good physical and mental health are essential for the successful study and practice of dentistry. Good eyesight is particularly important. The applicant who is admitted to the School of Dentistry must present on or before the day of enrollment, a certificate from the examining doctor stating the condition of his eyes, and if any correctible defects in vision exist he shall present evidence that proper corrections have been made.

A deposit fee of $50.00 for residents and $100 for nonresidents is required when the applicant accepts offer of admission. This amount will be applied as part-payment of the tuition fee when the applicant registers for the First Semester. The deposit will be forfeited if the applicant fails to register.

Division of Dental Hygiene. The dental hygiene program is a division of the School of Dentistry. Its curriculum offers a four-year degree program for dental hygienists. Upon the fulfillment of all prescribed requirements and with the recommendation of the School of Dentistry, the candidate will be awarded the Bachelor of Science in Dental Hygiene degree. The general admission policies established by WVU must be met. The applicant must be a graduate of an accredited high school or preparatory school which is acceptable for college entrance. One unit in both algebra and plane geometry and 4 units of English will be necessary for admission. The Dental Hygiene Aptitude Test will be required of every applicant.

Further details concerning requirements of the School of Dentistry may be obtained by writing to the Office of Admissions and Records, Medical Center, or the Director of Dental Hygiene.

Complete information concerning the School of Dentistry may be found in the current *WVU Medical Center Catalog.*

COLLEGE OF ENGINEERING OR SCHOOL OF MINES

For admission to the College of Engineering or the School of Mines, prospective students must be qualified for admission to WVU, present credit for 2 units of algebra and 1 unit of geometry (1 unit of plane geometry or 1 unit integrated geometry or ½ unit plane geometry and ½ unit solid geometry) and ½ unit of trigonometry. Students who do not meet these requirements in mathematics may apply for admission as pre-engineering students in the College of Arts and Science. All applications should be sent to the Office of Admissions and Records.

It is highly recommended that prospective students take the American College Tests (ACT) in the spring preceding their admission to the College of Engineering or School of Mines. Based upon these test results, it is further recommended that students who require an additional background in mathematics or English attend the Summer Session of the University, enrolling in courses such as Math. 3 (College Algebra) and Math. 4 (Plane Trigonometry). Completion of these courses will permit the student to enter the regularly scheduled engineering program at the beginning of the First Semester.

Students desiring to transfer from another college, school, or university into the College of Engineering or the School of Mines must meet the following requirements:

(A). Have a grade-point average of 2.0 or higher for all college level courses (Math. 0, 1, 2, and 7 count for entrance only).

(B). Have a grade-point average of 2.0 or higher for all mathematics courses excluding only Math. 0 and 1.

COLLEGE OF HUMAN RESOURCES AND EDUCATION

Requirements for admission to the undergraduate programs of the College of Human Resources and Education are listed by Divisions in subsequent pages of this *Catalog.* Candidates for bachelor's degrees in Home Economics and in Speech Pathology and Audiology may enter these programs during the freshman year.

Students who enter the Division of Education must have completed a minimum of 58 semester hours with a grade-point average of at least 2.25 on all work attempted. These candidates register for their first two years of work in the College of Arts and Sciences. Freshmen and sophomores who expect to enter the Division of Education, College of Human Resources and Education, will indicate their intention when they register. Their studies will be directed by advisers for pre-education students. Such students should so arrange their courses of study so as to satisfy requirements for junior standing and should be fulfilling requirements for certification of teachers.

SCHOOL OF JOURNALISM

A candidate seeking admission to the School of Journalism for the purpose of obtaining a degree must have satisfied requirements for admission to one of the University undergraduate colleges and must have earned at least 58

semester hours of college credit. A student deficient in the physical education general program will be required to take these subjects as soon as possible. During his freshman and sophomore years he should have completed satisfactorily all or most courses specified for prejournalism majors. A prejournalism student not maintaining at least a C average during his first two years in all college subjects must apply directly to the School of Journalism Committee on Academic Standards for admission.

COLLEGE OF LAW

The College of Law can admit only 100 in each entering class. Each year there are many more qualified applicants than openings. To encourage early application, half of each entering class will be chosen on or about January 30 of the year preceding the First Semester of registration for the school year beginning in August.

Beginning students are admitted only in August. The first year of law is an integrated course, and Second Semester, first-year courses are, for the most part, continuation of the First Semester work.

Facilities and personal limitations do not permit admission of part-time or special students.

Applications may be filed at any time after September 1 prior to the August of expected commencement of law study. However, applications will be closed on March 1 preceding the August of commencement of law study.

Applicants are encouraged to file applications based upon six semesters of undergraduate work and to take the October or December administration of the Law School Admission Test if they have not previously taken the test. Applications of those who have not yet received their undergraduate degrees will be processed, and accepted applicants notified prior to their receiving such degrees. Such acceptance will be subject to confirmation upon the awarding of undergraduate degrees, since no applicant may commence law study without having his undergraduate degree.

All correspondence should be addressed to the WVU College of Law, 1530 University Avenue, Morgantown, West Virginia 26506. Action on this application can only be taken after the College of Law has received: (1) a nonrefundable $10.00 application fee payable to West Virginia University; (2) an official transcript from each college previously attended (applicants are required to use the Law School Data Assembly Service of the Educational Testing Service, Box 944, Princeton, N.J. 08540); (3) the results of the official Law School Admission Test as administered by the Educational Testing Service, in October, December, February, April, and July each year; and (4) two character recommendations (one from a former undergraduate officer, another from a hometown attorney). The applicant has responsibility for ascertaining that his credentials have been received by the WVU College of Law.

A formal statement of the rules regarding admission, and other requirements, may be found in the *WVU College of Law Catalog*, available upon request to the Office of Admissions and Records. Upon evaluation of an applicant's qualifications, and personal interview if requested, official admission to the University for study in the College of Law will be issued by the WVU Office of Admissions and Records.

SCHOOL OF MEDICINE

Applicants for admission to the School of Medicine, who have completed undergraduate requirements, should write to the Office of Admissions and Records, WVU Medical Center, which will furnish official blanks upon which formal application must be made.

A $10.00 application fee is required and must accompany the application.

The requirements outlined below may be met in either of two ways: first and preferably, by pursuing a course of study leading toward a bachelor's degree with major and minor fields of the applicant's own choosing; or secondly, by following a more rigidly prescribed curriculum generally offered as a "premedical" curriculum. In either case, the applicant must have completed satisfactorily the minimum requirements listed below:

English Composition and Rhetoric	1 year
Biology (with laboratory)	1 year
Inorganic Chemistry (with laboratory)	1 year
Organic Chemistry (with laboratory)	1 year
Physics (with laboratory)	1 year
Social or Behavioral Sciences	1 year

A total of 90 semester hours of work, exclusive of Military Science or Air Force Aerospace Studies and physical education, is required.

The number of students the School of Medicine can accommodate is strictly limited. Applications for admission are considered by the Committee on Admission of the School of Medicine, which selects those with the highest qualifications of scholarship and personal fitness. An important factor is the score of the applicant on the Medical College Admission Test sponsored by the Association of American Medical Colleges and given at suitable times. Students should consult premedical advisers about this test or should write to The Psychological Corporation, 304 East 45th St., New York, New York 10017. Applications for admission may be made as much as a year in advance of the opening date.

Each applicant is required to deposit $50.00 before his name is entered upon the official list of those accepted to the School of Medicine. If the applicant enrolls, the sum is applied to his tuition for the First Semester. If the application is withdrawn after the applicant has been offered a place and has made a deposit, such deposit may be refunded at any time before March 1 of the year in which enrollment is anticipated.

Complete information concerning the School of Medicine may be found in the current *WVU Medical Center Catalog*.

Medical Technology

(A). Admission requirements for the first year (premedical technology) are those of the College of Arts and Sciences.

(B). Admission to the third year (Medical Technology I) is based upon two years of college work with a total of 64 semester hours, as follows:

English. 6 hours. (Composition and rhetoric.)

Biological Science. 8 hours.

Chemistry. 15-16 hours. (Inorganic chemistry, 8 hours; quantitative analysis, 3-4 hours; organic chemistry, 4 hours.) (Transfer students are required to have a complete course in organic chemistry to include aliphatic and aromatic compounds.)

Physics. 8 hours.

Physical Education. 2 hours.

Mathematics. 3 hours. (College algebra.)

Electives to complete the required hours and to meet Core Curriculum requirements. Courses such as bacteriology, parasitology, and anatomy should not be taken until after the completion of the sophomore year. A foreign language is recommended for students who plan to do graduate work.

Physical Therapy

Applicants for admission to the Division of Physical Therapy must have completed two years (62 or more credit hours) of study in the College of Arts and Sciences. University Core Curriculum requirements must be satisfied during the first two years and must include two semesters each of physics, chemistry, and biological sciences.

Completion of the first two years does not automatically assure the student a place in the junior class. Each student must apply to the Division of Physical Therapy after December 1 of the sophomore year. Application forms for the final two years are available from the Office of Admissions and Records, WVU Medical Center. Students will be accepted on a competitive basis and selections will be based on scholastic standing, motivation and other personal characteristics which are desirable in physical therapists.

For further information, see the *WVU Medical Center Catalog*, or contact the Director of Physical Therapy.

SCHOOL OF NURSING

Initial application to the University should be submitted to the Office of Admissions and Records and should follow the same procedure as for all other University freshmen.

Students are enrolled as pre-nursing students in the College of Arts and Sciences for the freshman year. Contact with the School of Nursing is insured during this year through two required nursing courses and nurse-faculty advisers for pre-nursing students.

Application for admission to the School of Nursing should be made on or about December 1 of the college freshman year. Application forms are available upon request from the Office of Admissions and Records, WVU Medical Center.

A candidate for nursing should have good physical and mental health as well as those personal qualifications appropriate to a professional person. The School of Nursing through its Admissions Committee admits students who, by reason of personal and intellectual qualities, show promise of benefiting from the program and of contributing to the field of nursing. Factors influencing decisions of the Admissions Committee are: academic record, motivation for academic nursing, health, personal qualities, and social adjustment.

A dominant factor in admission is the availability of spaces in the class. Applicants, who, in the judgment of the Admissions Committee, present the highest overall qualifications are selected for admission to nursing. Upon acceptance, a $50.00 tuition deposit is required.

Additional information concerning the School of Nursing may be found in the *WVU Medical Center Catalog.*

Nursing Transfer Students

A student from any other accredited college or university is eligible for admission with credit if she or he presents a grade-point average of 2.0, or better, based on all work attempted at previous institutions. Courses must be comparable to those required in the University's curriculum, except for courses in Orientation to Nursing. Because of the design of this curriculum, a transfer student must complete a minimum of three years and a Summer Session in the School of Nursing regardless of previous college credit.

Application for transfer should be initiated by December 1 in order to allow time for evaluation and processing of credentials. Graduates of Associate Degree programs in nursing are regarded as transfer students.

SCHOOL OF PHARMACY

The professional curriculum of the School of Pharmacy is based on two years of pre-pharmacy requirements which are as follows:

Algebra	3 hr.	Physics	8 hr.
Trigonometry	3 hr.	Electives from	
English Composition	6 hr.	Core Group A (see p. 37)	12 hr.
Principles of Economics	6 hr.	Core Group B (see p. 37)	6 hr.
Biology, General	8 hr.		
Chemistry, General	8 hr.		
Chemistry, Organic	8 hr.	Total	68 hr.

A 2.0 average in all courses undertaken, except Military Science (ROTC), Air Force Aerospace Studies (ROTC), and Physical Education, is considered the minimum standard for admission.

For admission to the School of Pharmacy, formal application should be made to the Admissions Committee of the School as early as possible after February 1, but before June 1, preceding the fall term (First Semester) in which the student is seeking enrollment.

Applicants should write to the Office of Admissions and Records, WVU Medical Center, which will furnish official blanks upon which formal application must be made.

A $10.00 application fee is required and must accompany the application.

Each applicant is expected to deposit $50.00 before his name is entered upon the official list of those accepted to the School of Pharmacy. If the applicant enrolls, this sum is applied to the First Semester tuition. If the applicant fails to enroll, this deposit fee is forfeited by the applicant.

Complete information may be obtained from the Dean of the School of Pharmacy or from the Office of Admissions and Records, WVU Medical Center.

Fees and Expenses

All University fees are subject to change without notice.

All fees are due and payable at the Comptroller's desk in the Coliseum on the days of registration. Students must pay fees before registration is accepted. Completion of arrangements for payment from University payroll checks, officially accepted scholarships, loan funds, grants or contracts shall be considered sufficient for acceptance of registration. Fees paid after regular registration must be paid to the University Cashier in Mountainlair. Any student failing to complete registration on regular registration days is subject to the Late Registration Fee of $10.00. Students registering pay the fees on page 27, plus special fees and deposits as required.

No degree will be conferred upon any candidate prior to payment of all tuition, fees, and other indebtedness to any unit of the University.

Special Fees

Late-registration Fee (non-refundable)[1]	$ 10.00
Graduation Fee[2]	10.00
Professional Engineering Degree (including $10.00 graduation fee)	25.00
Student's Record Fee[3]	1.00
Fee for Change in Registration (after 8th day)	1.00
Fee for Examination for Entrance Credit, per unit	1.00
Fee for Examination for Advanced Standing	3.00
Fee for General Educational Development Tests (high-school level)[4]	15.00
Certificate of Advanced Study in Education	2.00
Fee for Reinstatement of Students Dropped From the Rolls	3.00
Diploma Replacement Fee	5.00
Physical Education Student Fee	5.00
Student Identification Card Replacement Fee	1.00
Correspondence Course in Guided Reading (per course)	1.00
Driver Education Laboratory Fee	20.00
Labor Education Service (for informal activities)	2.00-10.00
Social Work Field Supervisory Fee (per semester)	70.00

Laboratory Fees

Consult departmental sections of this Catalog for information concerning non-refundable laboratory fees, deposits, and microscope rental fee. (See Biology, Chemistry, Family Resources, Forestry, Geology, Physical Education, Physical Sciences, Physics, and Psychology.)

[1]This fee is not charged to full-time students who complete registration during the regular registration days set forth in the University Calendar. This fee is not charged to part-time students who complete registration by the close of office hours on the eighth day following the beginning of General Registration.

[2]The Graduation Fee is payable by all students at the beginning of the semester or term in which they expect to receive their degrees.

[3]One transcript of a student's record is furnished by the Office of Admissions and Records without charge. This fee is charged for furnishing an additional transcript.

[4]If the applicant applies for admission to and registers in the University within twelve months of the date of his qualifying for the test, a $10.00 credit shall be established for him.

SEMESTER FEES IN THE COLLEGES AND SCHOOLS

College, School Or Division	Full-Time†	
	Resident	Nonresident
GROUP I Agriculture and Forestry Arts and Sciences Business and Economics Creative Arts Center Engineering Human Resources and Education Journalism Mines Physical Education Social Work	$105.00° plus Registration Fee of $50.00	$270.00° plus Registration Fee of $200.00 and Nonresident Undergraduate Student Service Fee of $100.00
GROUP II Dental Hygiene Law Medical Technology (Jr. and Sr. Years) Nursing Pharmacy Physical Therapy (Jr. and Sr. Years)	$120.00° plus Registration Fee of $50.00	$295.00° plus Registration Fee of $200.00 and Nonresident Undergraduate Student Service Fee of $100.00 (Law students excluded from Nonresident Undergraduate Service Fee)
GROUP III Dentistry Medicine	$182.00° plus Registration Fee of $50.00	$400.00° plus Registration Fee of $200.00

Part-Time†

Tuition, per semester hour	Resident	Nonresident
Undergraduate students	$ 9.00°°	$41.25°°°
Graduate and professional students (Dentistry, Law, Medicine)	14.00°°	38.00°°°

†A full-time undergraduate student is one who is registered for 12 or more semester hours of work each semester of the regular academic year, or 9 or more semester hours of work during the 9-week Summer Session. A full-time student during the regular academic year receives an Identification Card which entitles him to all athletic events. A full-time student during the regular academic year or during the Summer Session is entitled to free medical consultation and advice from the University physician. A moderate charge is made for room calls, X-ray, special laboratory tests, drugs furnished by the University Pharmacy, minor operations, treatment of fractures and dislocations, and intravenous treatment.

A part-time undergraduate student is one who is registered for fewer than 12 semester hours per semester during the regular academic year, or for fewer than 9 semester hours during the 9-week Summer Session.

The minimum rate for noncredit courses is that charged for one semester hour of credit.

°Includes Athletics Fee, $8.25; Student Educational Services Fee, $10.00; Daily Athenaeum Fee, $1.50; Health, Counseling, and Program Services Fee, $21.00; Mountainlair Construction Fee, $20.00; Inter-Campus Bus System Fee, $4.25.

°°Includes $4.00 per semester hour Registration Fee.

°°°Includes $16.00 per semester hour Registration Fee.

Mountainlair Construction Fee and Daily Athenaeum Fee

The following fees are charged all students, full-time and part-time, who are enrolled for regular courses of resident instruction at WVU in Morgantown.

Mountainlair Construction Fee	$20.00 per semester
Daily Athenaeum Fee	$ 1.50 per semester
Mountainlair Construction Fee	$12.00 per summer term in excess of 4½ weeks
Daily Athenaeum Fee	$ 1.00 per full summer session

These fees are non-refundable unless the student withdraws officially before the close of General Registration for the term or course in which he has been enrolled.

Fees for Extension Courses

A fee of $14.00 per semester hour and an off-campus extension fee of $20.00 per course are charged for enrollment in each extension course. Fees for extension courses are due and payable at or before the first class meeting.

Undergraduate and Graduate Music Students

Full-time or part-time students registered for bachelors' or advanced degrees in Music or the Supervisory Training Program in Music shall pay the regular full-time or part-time fees for all courses in music. No additional fees are assessed for Applied Music.

Students registered in other colleges or schools, including the Graduate School, may enroll in class courses in music at the regular full-time rate or part-time fee per credit hour. These students may also enroll for Applied Music for a maximum of one half-hour lesson per week. The fee for this Applied Music instruction shall be $20.00 in addition to the aforementioned tuition and registration fees.

Practice and Rental Fees

(a) Practice room—one hour a day, $6.00 per semester; two hours, $10.00; three hours, $14.00; four hours, $18.00.
(b) Pipe-organ practice—one hour a day, $10.00 per semester.
(c) Band and orchestra instruments—rental fee $2.50 per semester.

SUMMER SESSION

The Summer Session is nine weeks in length. It opens in June and closes in August.

Requirements for admission and character of the work offered are the same for the Summer Session as for the regular academic year.

Credit may be obtained toward the bachelor's, master's, and doctorate. Offerings are varied from summer to summer so that students may complete work for the master's degree by attending Summer Session only.

For complete information, see the *Summer Session Bulletin.*

SUMMER SESSION FEES

Tuition Per Semester Hour

	Resident	*Nonresident*
Undergraduate students	$ 9.00*	$41.25**
Graduate and professional students (Dentistry, Law, Medicine)	14.00	38.00**
Daily Athenaeum Fee††	1.00	1.00
Health, Counseling, and Program Services Fee†	12.25	12.25
Mountainlair Construction Fee per summer term in excess of 4½ weeks††	12.00	12.00
Mountainlair Construction Fee per 4½-week summer term or any portion thereof††	6.00	6.00
Student Educational Services Fee†	5.00	5.00
Inter-Campus Bus System Fee†	2.00	2.00

*Includes $4.00 per semester hour Registration Fee.
**Includes $16.00 per semester hour Registration Fee and $8.25 per semester hour Nonresident Undergraduate Student Service Fee.
†Non-refundable fees required of full-time students. May be paid by part-time students who desire the services. Part-time students who elect to pay these fees must pay the same amount assessed full-time students.
††Fee required of all students. (Non-refundable unless student withdraws officially before the close of general registration.)

IDENTIFICATION CARD

An identification card is issued to each full-time student upon paying full fees. It entitles the owner admission to certain University athletic events, various activities of student government, Health Service, and Mountainlair. Confiscation will result from misuse. The University reserves the right to refuse reissuance of an identification card.

UNIVERSITY EMPLOYEES

The spouse and dependent children of any person employed full-time by the West Virginia Board of Regents shall be charged the same fees as resident students. The spouse and dependent children of full-time interns, residents, and fellows in the School of Medicine, School of Dentistry, and University Hospital programs shall also be charged the same fees as resident students.

REFUNDING OF FEES

A student who officially withdraws from University courses may arrange for a refund of fees by submitting to the University Comptroller evidence of eligibility for a refund.

To withdraw officially from the University a student must apply to the Dean of Admissions and Records for permission. Semester fees will be returned in accordance with the following schedule:

First refund period ending on the twelfth day following the beginning of General Registration.	All Activity fees chargeable to Special Services and all other semester fees less $2.50. (Under no circumstances is the amount retained less than $2.50.)
Second refund period ending on the fifth Friday following the beginning of General Registration.	70% of all refundable fees.[5]
Last refund period ending on the eighth Friday following the beginning of General Registration.	40% of all refundable fees.[5]

The second Friday following the beginning of General Registration for the Summer Session is the end of the refund period.

No part of the Activity Fee is refundable unless the student withdraws from the University.

University policy provides that students called to the armed services of the United States may be granted full refund of refundable fees, but no credit, if the call comes before the end of the first three-fourths of the semester, and that full credit by courses be granted to persons called to the armed services of the United States if the call comes thereafter; provided, however, that credit as described above will be granted only in those courses in which the student is maintaining a passing mark at the time of his departure for military service. In the recording of final grades, for three-fourths of a semester or more, both passing and failing grades are to be shown on the student's permanent record.

RESIDENTIAL STATUS

The West Virginia Board of Regents has adopted regulations governing the classification of students as residents or nonresidents for admission and fee purposes at all institutions under its jurisdiction.

General

Students enrolling in a West Virginia public institution of higher education shall be classified as resident or nonresident for admission, tuition, and fee

[5]Tuition, Registration Fee, Athletics Fee, Student Educational Services Fee, Health, Counseling, and Program Services Fee, and Inter-Campus Bus System Fee. The Mountainlair Construction Fee and Daily Athenaeum Fee are non-refundable after the twelfth day following the beginning of General Registration.

purposes by the Registrar or other officer designated by the President. (At WVU, the Dean of Admissions and Records.) The decision shall be based upon information furnished by the student and all other relevant information. The Dean of Admissions and Records is authorized to require such written documents, affidavits, verifications, or other evidence as are deemed necessary to establish the domicile of a student, including proof of emancipation, adoption, award of custody, or appointment of a guardian. The burden of establishing that a student is exempt from paying the nonresident tuition and fees is upon the student.

If there is a question as to residence, the matter must be brought to the attention of the Dean of Admissions and Records and passed upon at least two weeks prior to registration and payment of tuition and fees. Any student found to have made a false or misleading statement concerning his residence shall be subject to dismissal from the college.

For purposes of resident and nonresident classifications, the word "parents" as herein used shall include legal guardians.

Residence Determined by Domicile

Domicile within the state means adoption of the state as a fixed permanent home and involves personal presence within the state. West Virginia domicile is presumed to be established upon the completion of at least twelve months of continued residence within the state prior to the date of first registration, provided that such twelve months residency is not for the purpose of attendance as an undergraduate or graduate student at any institution of learning in West Virginia.

Establishment of West Virginia domicile with less than twelve months residence prior to the date of first registration must be supported by proof of positive and unequivocal action such as the purchase of a West Virginia home, establishment of a permanent place of residence, full-time employment within the state, and assessment of property tax. Proof of one or more of these actions shall be considered only as evidence which may be used in determining whether or not a domicile has been established.

There must be no intent on the part of the person involved to return to another state or country.

Minors

The residence of a minor shall follow that of the parents at all times, except in extremely rare cases where emancipation can be proved beyond question. The residence of the father, or the residence of the mother if the father is deceased, is the residence of the unmarried or unemancipated minor. If the father and the mother have separate places of residence, the minor takes the residence of the parent with whom he lives or to whom he has been assigned by court order. The parents of a minor will be considered residents of West Virginia if their domicile is within the state.

A student who is properly enrolled in an institution as a resident student shall retain that classification as long as he continues to enroll each semester.

Emancipated Minor

An emancipated minor may be considered as an adult in determining residence, provided satisfactory evidence is presented that his parents, or legal guardian, if living, do not contribute to his support and do not claim him as a dependent for federal government income tax purposes.

In the event that the fact of emancipation is established, the emancipated minor assumes all of the responsibilities of an adult to establish residence for tuition and fee purposes. Proof must be provided that emancipation was not achieved principally for the purpose of establishing residence for attendance at an institution of higher education.

An emancipated minor, orphan, or abandoned child who has been domiciled in West Virginia for at least one year following his emancipation and next preceding the date of registration may be classified as a resident for tuition and fee purposes.

Students Over 21 Years of Age

A resident student twenty-one years of age is (1) one whose parents were residents of the state at the time he reached his majority and who has not acquired a domicile in another state, or (2) who, while an adult, has established a bona fide domicile in the state of West Virginia. Bona fide residence in West Virginia means that the student must not be in the state primarily to attend a college and he must be in the state for purposes other than to attempt to qualify for resident status.

Any nonresident student who reaches the age of twenty-one years while a student at any school or college in West Virginia does not by virtue of such fact attain residence in this state for admission or tuition and fee payment purposes.

A student who is classified as a resident at the time that he reaches the age of twenty-one shall continue to be classified as a resident provided that he retains a domicile in West Virginia and that he does not establish a domicile, or legal residence, in another state.

Marriage

The residence of a married person is determined by the same rules which would apply if he or she were not married. Persons previously classified as residents under earlier marriage regulations shall not be reclassified as nonresidents according to the terms of this policy.

Military

An individual who is on active federal military service or an employee of the federal government may be classified as a resident for the purpose of payment of tuition and fees provided he had established domicile in West Virginia prior to entrance into federal service, that he entered the federal service from West Virginia, and that he has at no time while in federal service claimed, or established, a domicile in any other state. Sworn statements attesting to these conditions may be required. The wife and dependent children of such individuals shall also be classified as residents of the state of West Virginia for tuition and fee purposes.

Aliens

An alien who has entered the United States on a resident visa, or who has taken out first papers for citizenship, and who has established a bona fide residence in West Virginia by living in the state for at least twelve consecutive months immediately preceding registration may be eligible for resident classification, provided he is in the state for purposes other than to attempt to qualify for resident status as a student.

Higher Education Personnel

Full-time employees of the Board of Regents and the institutions under its jurisdiction, full-time ROTC personnel assigned to the institutions, and their spouses and dependent children, shall be considered West Virginia residents for the purpose of the payment of tuition and fees.

Appeal Process

The decisions of the Dean of Admissions and Records may be appealed to the President of the University. The President may establish such committees and procedures as he determines necessary for the processing of appeals. The decision of the President may be appealed in writing with supporting documentation to the Board of Regents. The appeal will be reviewed by the State Committee on Residency which shall make recommendations to the Board for final decision. The members of the State Committee on Residency shall be appointed by the Board of Regents.

SERVICE CHARGE ON RETURNED CHECKS

A service charge of 5 per cent of the amount of each check returned unpaid by the bank upon which it is drawn shall be collected unless the student can obtain an admission of error from the bank.

If the check returned by the bank was in payment of University and registration fees, the Comptroller's Office shall declare the fees unpaid and registration cancelled if the check has not been redeemed within three days from date of written notice. In such a case the student may be reinstated upon redemption of the check, payment of the 5 per cent service charge, Reinstatement Fee of $3.00, and Late Payment Fee of $10.00.

COST OF AN ACADEMIC YEAR'S WORK

A student's textbooks will cost approximately $100 a year and his enrollment fees will approximate $310 if he is a resident; or $1,140 if a nonresident. Nonrefundable fees range from $2.00 to $20.00. In Military Science and Air Force Aerospace Studies a $20.00 deposit is required to cover military equipment in the custody of the student, practically all of which is returned to the student when he accounts for his equipment. Board and room may be obtained at from approximately $1,140 to $1,264 a year. Traveling expenses, clothing, and other miscellaneous items will depend largely upon the taste and habits of the individual student. In general, however, it may be said that the legitimate cost of a 9-month term of residence at the University ranges from $1,800 for resident students to $2,650 for nonresident students.

REGISTRATION

Persons not registered as University students and who are not members of its administrative or teaching staffs shall not be admitted to regular attendance in University classes.

All students are expected to register on days set apart for registration at the beginning of each semester or session of the University.

Immediately after completion of registration, all students must pay fees at the Comptroller's desk in the Coliseum.

LATE REGISTRATION

No student will be permitted to register at the University after the twelfth day of a semester or the fourth calendar day of the Summer Session or a summer term. Days are counted from the first day of registration.

AUDITORS

Students may enroll in courses without working for grade or for credit by registering as auditors and by paying full fees. Change in status from audit to credit or from credit to audit may be made during the registration period. Attendance requirements for auditors shall be determined by the instructor of the course being audited. It is the prerogative of the instructor to strike the name of any auditor from grade report forms and to instruct the Office of Admissions and Records to withdraw the auditor from the class, if he should fail to meet such attendance requirements.

VISITORS

Full-time University students may attend classes as visitors, provided they obtain the written permission of their advisers and of the instructors in classes they desire to visit. Members of the administrative or teaching staffs, or other regular employees of the University, may attend classes as visitors provided they obtain written permission of the chairmen of their departments and of the instructors in the classes which they desire to visit.

No record is kept of the work and attendance of persons admitted to classes as visitors and no credit is given for their work in such classes. Such persons may not obtain credit by advanced standing examinations in courses attended as visitors.

EVENING EDUCATION

The University offers a program of evening classes for the benefit of those who wish to continue their education beyond the high-school level and who are unable to attend the usual day classes.

All courses are taught by resident faculty members and carry full college residence credit. Many of these courses may be counted toward advanced degrees.

Regulations Affecting Degrees

Candidates for degrees are eligible for graduation when they complete the requirements in the college or school in which they are registered which were in effect at the time of their first registration in that college or school, provided they apply for graduation within a period of seven years from the time of their first registration. Students who fail to complete the requirements for graduation within seven years from their first registration shall satisfy the requirements in effect at the time they apply for graduation.

University policy provides that in view of public and professional responsibilities the faculty of each of the professional schools of WVU shall have the authority to drop any student from its rolls whenever, by formal decision reduced to writing, the faculty finds that the student is unfit to meet the qualifications and responsibilities of the profession.

All degrees are conferred by the Board of Regents upon recommendation of the faculties of the various colleges and schools. Degrees are granted at the close of the semester or Summer Session in which the students complete their work.

Attendance at the spring Commencement is voluntary. If you don't plan to attend, leave the complete mailing address to where you want your diploma mailed at your dean's office.

BACCALAUREATE DEGREES

Credits and Grade Points Required

Less than 6 hours in an ancient or modern language will not be counted toward any University degree, diploma, or certificate unless work in the same language has been offered for entrance.

Six hours of English composition and rhetoric (English 1 and 2) are required of all candidates for the bachelor's degree in all colleges and schools of the University.

Two hours of physical education, to be taken during the first year in residence, are required for graduation, except in the case of students entering with advanced standing amounting to 58 semester hours or more. (See "General Program" in the School of Physical Education section of this *Catalog*.) The University Health Service will determine whether students are physically qualified for required physical education courses and for active participation in other University activities.

Each baccalaurate degree is conditioned upon the completion of a specified number of semester hours of credit. For the number of credit hours required for each degree, see pages 42-43.

All divisions of the University require minimum standards of scholastic quality. Grade points are computed only on grades earned at WVU and at other institutions in the West Virginia state system of higher education. To be eligible for graduation, a student must have a grade-point average of 2.0 (C) or higher on all work for which he receives grades (except W, WU,

and P). In addition, specific degree programs may require minimum grades of C, or in some cases higher than C, in specific courses or portions of the baccalaureate program.

Seventy-two hours of credits and grades earned for college-parallel courses completed at community colleges or branch colleges in the West Virginia system of higher education may be applied toward a baccalaureate degree at WVU. Transfer credit for college-parallel courses completed at other community colleges and junior colleges may not exceed 72 hours. Transfer credit from community colleges and junior colleges is normally limited to lower-division courses.

It is the student's responsibility to keep informed of his grade-point standing. This information may be obtained at any time from the dean of the college or school in which the student is registered.

Cum Laude and Magna Cum Laude Graduates

The University recognizes distinguished academic achievement by awarding initial baccalaureate degrees *Cum Laude* and *Magna Cum Laude* to qualified students. The following regulations govern these awards:

1. Grade-point averages for graduation *Cum Laude* or *Magna Cum Laude* shall be computed by either:

   (a) Starting with the student's penultimate semester or term and continuing in reverse chronological order until at least 48 semester hours excluding credits earned with a grade of P have been counted. If, in order to total the required number of hours it is necessary to include any part of a semester or term, the work of the whole semester shall be included.

   (b) The cumulative grade-point average in all work completed at WVU through the student's penultimate semester or term provided the total work completed is 49 semester hours or more.

2. Students who transfer to WVU from institutions within the West Virginia state system of higher education on or after January 2, 1972, may be eligible for graduation with honors based on either computational system stated above.

3. Students who transfer to WVU from institutions not within the West Virginia state system of higher education, may be eligible for graduation with honors from WVU provided that they meet the requirements of paragraph 1(b) above.

4. Subject to the above conditions, all candidates for a baccalaureate degree whose grade-point average in the work covered by either 1(a) or 1(b) above, is 3.6 or higher, shall be graduated *Magna Cum Laude*. All those whose average is lower than 3.6 but is 3.3 or higher shall be graduated *Cum Laude*.

5. Fitting recognition of graduation *Cum Laude* or *Magna Cum Laude* shall be made on the candidate's diploma and in the Commencement program.

University Core Curriculum Requirements

I. Two semesters of work in English composition.

(a) Students demonstrating special ability in English will be excused from English 1 and 2, the number of students and the mechanics of selection to be decided by the Department of English.

(b) No credit will be granted for courses from which a student is excused.

(c) Students excused from English 1 and 2 will be required to take 6 hours of other courses, the selection of same to rest with the student with the advice and consent of his adviser.

II. Remedial work in mathematics to cover the deficiency if the student, upon entering the University, lacks proficiency in mathematics equal to that normally attained in two years of high school mathematics.

III. Twelve° credit hours of work in selected approved courses in each of the three following disciplinary areas, including courses in at least two subjects in each group:

Group A

1. Art
2. Drama
3. English (exclusive of 1 and 2)
4. Humanities
5. Languages
6. Music
7. Philosophy
8. Religious Studies
9. Speech Communication

Group B

1. Economics
2. Geography
3. History
4. Political Science
5. Psychology
6. Sociology
7. Social Science
8. Forestry 140

Group C

1. Biology
2. Bacteriology
3. Entomology
4. Genetics
5. Nutrition
6. Physiology
7. Chemistry
8. Geology
9. Mathematics
10. Astronomy
11. Physical Science
12. Physics
13. Statistics

°Two 4-credit courses and one 3-credit course may be substituted in lieu of 12 credit hours.

The determination as to whether ROTC courses will be counted toward fulfillment of the core curriculum or will be counted as free electives is the prerogative of the department chairman or dean of the appropriate college. This is in keeping with the Board of Regents' orders effective at the end of the First Semester of the 1967-68 academic year which stipulated that "each academic division of the University must allow at least 8 hours of credit toward graduation for courses in Military Science and Air Force Aerospace Studies, if earned during the first two years of enrollment . . . A student electing to take Military Science or Air Force Aerospace Studies should consult his department chairman or dean of his college for determination as to how the 8 hours of academic credit will be credited toward fulfilling graduation requirements."

Requirements As to Residence

Students who come to the University from other colleges or universities should transfer not later than the beginning of their third year. In no case will a student who matriculates in the University later than October 1 in any year be permitted to receive a degree at the next Commencement.

In special cases students who desire to leave the University at the close of their third year to enter another institution for the purpose of taking a combined course leading to two degrees or of preparing for graduate study, upon application beforehand to the Committee on Academic Standards of the college or school in which they are registered, may be permitted to do the work of the fourth year, or a part thereof, at such other institution and to receive the bachelor's degree from the University upon the presentation of the proper credits.

The transfer student whose undergraduate work has been altogether in institutions within the West Virginia state system of higher education must complete either the last 30 hours of his work, or a minimum of 36 hours including 16 of his last 32 hours, in residence. Other transfer students must complete either a total of at least 90 hours or the last 30 hours in residence at the University. The transfer student may be required to earn up to 15 hours in his major field in residence regardless of the number of hours and the nature of the courses transferred.

College Credit Defined

A college credit or semester hour represents the amount of work done in one recitation hour per week for the duration of a semester. Normally a student will spend two hours preparing for an hour recitation period. As a rule, two to three hours of laboratory work are equivalent to one hour of recitation.

Work Done Out of Residence

It is the policy of the University to discourage the taking of regular residence courses in absentia. In the case of courses begun at the University and not completed because of illness or for other acceptable reasons, however, permission to complete the work in absentia under the direction of regular University instructors may be granted by the Committee on Academic Standards; but in such case credit should be given only upon a report of a grade of no less than C on final examination.

This regulation does not apply to University extension courses.

After a student enrolls on the Morgantown campus, he must obtain advance approval in writing from his adviser, his dean, and the Dean of Admissions and Records to obtain credit toward a degree for courses offered at other institutions and undergraduate branches of the University. An overall average of C is required on all work completed at the University in order to obtain such approval. Transfer credit from schools not affiliated with the University will be accepted for courses carrying a grade of C or higher when conditions indicated above have been met.

Maximum and Minimum Work

The maximum and minimum number of hours per semester as well as the maximum number of hours per year for which a student may register during the regular academic year of the University are:

	Minimum Hours Per Semester	*Maximum Hours Per Semester*	*Year*
Agriculture	14	20	—
Arts and Sciences	14	19	—
Business and Economics	14	18	—
Creative Arts Center	14	21	—
Dentistry	16	22	—
Engineering	12	20	—
Family Resources	14	18	34
Forestry	14	20	—
Human Resources and Education	12	18	36
Journalism	12	18	—
Law	13	16	—
Medical Technology	15	20	—
Medicine	17	20	—
Mines	12	20	—
Nursing	12	20	—
Pharmacy	14	20	—
Physical Education	14	20	—
Physical Therapy	16	20	—
Social Work	14	18	—

A student desiring to do irregular work (more or less than the prescribed number of hours in any college) must obtain permission from the Committee on Academic Standards in his college or school.

Credit for Correspondence Work

Credit up to a maximum of 30 semester hours for work completed by correspondence in non-laboratory courses will be accepted by the University when such work is given by accredited colleges or universities that accept work for credit toward their own degrees and whose residence work is accepted by WVU.

Substitution for Required Courses

A student who desires to substitute another course for any prescribed in his curriculum or required for the degree toward which he is working must obtain permission for such substitution from the Committee on Academic Standards in his college or school, but there can be no substitution from group to group.

Withdrawal from Class or University

A student who desires to withdraw from the University must obtain a withdrawal form from the Office of Admissions and Records (or dean's office

of an off-campus instructional unit). Withdrawal procedure will be explained at that time.

A student who withdraws without following this procedure will receive at the end of the semester a grade of F (failure) in each of the courses for which he is registered and will be indefinitely suspended from the University unless certified as to incapacitation by the dean of his college.

A student who desires to drop part of his work at any time following registration may withdraw from classes in which he is enrolled until the end of the fifth week of classes. Students will not be permitted to withdraw from courses after the fifth week of each semester (second week of the longer summer session; first week of the shorter summer session); the first day being defined as the initial day of upper-class registration. Students who withdraw prior to that day shall receive a grade of W. After that day (last day on which withdrawal is allowed) students will be allowed to withdraw only after approval by the Committee on Academic Standards. The grade to be recorded after that day will be W if the work is satisfactory or WU if the work is unsatisfactory. No withdrawal will be permitted after 18 days before the last day of classes of a semester (8th day before last day of classes of a session) except for withdrawal from the University. (W or WU grades will not be used in the computation of the student's grade-point average.)

A student must obtain the approval of his adviser for all withdrawals. The withdrawal becomes official only after the appropriate forms have been recorded by the Dean of Admissions and Records. If such withdrawal reduces the student's hour load below the required minimum, or if the student is on academic probation, he must obtain the approval of the appropriate authorities of the college or school in which he is registered.

It is the responsibility of the student to see that all forms are properly executed and delivered to the appropriate authorities for recording.

A student may appeal to the dean of his college to adjust his schedule at any time.

Re-Enrollment After Withdrawal

An undergraduate student who withdraws from the University in two consecutive semesters (excluding Summer Session) may not register for further work without approval of the dean of the college or school in which he wishes to register and subject to conditions set by that dean.

EXAMINATIONS AND REPORTS

Courses

As a rule courses extend through one semester only, although some are of a year's duration. No credit will be given for less than an entire course except by special order of the Committee on Academic Standards. Grades given at the end of the First Semester in courses extending throughout the year are merely indicative of the quality of work done by the student to that point and do not give credit for the part of the course so far completed. Such First Semester grades may be considered in determining the final grade, however.

Evaluation of Student Progress

Measurement and evaluation of learning, consistent with the objectives of the course, provide opportunity for the student and the teacher to evaluate progress through a variety of methods. Evaluation by final examination alone is discouraged.

Students are responsible for all material presented or assigned in scheduled instructional sections. Failure to complete all assigned work may result in a report of I or a grade of F at the discretion of the instructor.

Final examinations are held during the last week of each semester of the academic year and during the last two days of each Summer Session. A listing published in the *Schedule of Courses* each semester sets the time for each final examination.

The only tests permitted during the week of classes preceding finals will be in evening classes, practical laboratory tests, make-up examinations, and regularly scheduled short quizzes.

Absence from Examinations

Students are required to take all regular examinations. If a student attends a course throughout the semester and is absent from the final examination without permission, the instructor shall count the examination as zero and report the final grade as F. If, in the opinion of the instructor, absence of the student was for satisfactory reason, the grade of I may be reported.

Students who have been absent because of illness, authorized University activities, or other reasons approved by their deans, have the opportunity to make up regularly scheduled examinations.

Reports

In the seventh week of classes of each semester, instructors in all undergraduate courses shall submit a report of students doing unsatisfactory work, that is, earning grades of D or F. These grades are to be used for counseling and are not recorded on the student's permanent record in the Office of Admissions and Records. These reports are to be sent to the Dean of Admissions and Records or his representative and this information shall be transmitted to the student, parent or guardian, adviser, and dean of college.

Final grades are reported by instructors directly to the Office of Admissions and Records within 48 hours after the closing of the examination. The rule also applies to the final grades of all students registered in other colleges or schools of the University who are enrolled in law courses.

The final standing of all seniors provisionally approved for graduation at the close of the Second Semester shall be reported by their instructors to the deans of their colleges and schools, and the final standing of all graduate students provisionally approved for graduation shall be reported to the Dean of the Graduate School. Special report cards are supplied by the Dean of Admissions and Records.

A report of each student's work is made at the close of the semester or Summer Session to the student himself or to his parents or guardian.

CLASSIFICATION OF STUDENTS

The following shows the number of semester hours required for classification as second-year, third-year, and fourth-year students, and for graduation in the several colleges, schools, and divisions. First-year students must satisfy requirements as set forth beginning on page 15.

Freshman Classification	1-28 Hours, Inclusive
Sophomore Classification	29-58 Hours, Inclusive
Junior Classification	59-88 Hours, Inclusive
Senior Classification	89-Or More Hours, Inclusive

COLLEGE AND DEGREE

	Required for Degree
Agriculture and Forestry	
B.S. (Bachelor of Science)	128
B.S. in Agriculture (B.S.Agr.)	136
B.S. in Forestry (B.S.F.) Forest Resources Management and Wood Industry	138
B.S. (Bachelor of Science) Wildlife and Fishery Management, Recreation, Resources Management, and Forest Science	136
B.S. in Recreation (B.S.Rec.)	130
B.S. in Wood Science (B.S.W.S.)	130
Arts and Sciences	
Bachelor of Arts (A.B.) Regular	134
Bachelor of Science (B.S.)	
Chemistry	136
Geology	134
Physics	136
Statistics	134
Business and Economics	
B.S. in Business Administration (B.S.Bus.)	128
B.S. in Economics (B.S.Ec.)	128
Creative Arts Center	
Bachelor of Music (B.Mus.)	131-143
B.A. in Art (A.B.)	129-135
Bachelor of Fine Arts in Drama (B.F.A.)	138-139
Dentistry	
Doctor of Dental Surgery (D.D.S.)†	142
B.S. in Dental Hygiene (B.S.D.H.)	136
Engineering[6]	
Bachelor of Science	128
B.S. in Aerospace Engineering (B.S.A.E.)	134
B.S. in Agricultural Engineering (B.S.Agr.E.)	134
B.S. in Chemical Engineering (B.S.Ch.E.)	137
B.S. in Civil Engineering (B.S.C.E.)	130

COLLEGE AND DEGREE	
Engineering[6] (Continued)	**Required for Degree**
B.S. in Electrical Engineering (B.S.E.E.)	137
B.S. in Industrial Engineering (B.S.I.E.)	134
B.S. in Mechanical Engineering (B.S.M.E.)	132
Human Resources and Education[7]	
B.S. in Elementary Education (B.S.E.Ed.)	129
B.S. in Secondary Education (B.S.Sec.Ed.)	128
B.S. in Speech Pathology and Audiology (B.S.)	128
B.S. in Home Economics (B.S.H.E.)	128
Journalism	
B.S. in Journalism (B.S.J.)	128
B.S. in Journalism Education (B.S.J.E.)	128
Law	
Doctor of Jurisprudence (J.D.)††	81
Medicine	
Doctor of Medicine (M.D.)†††	72
B.S. in Medical Technology (B.S. Med. Tech.)	135
Mines	
B.S. in Engineering of Mines (B.S.E.M.)	144
B.S. in Petroleum Engineering (B.S.Pet.E.)	144
Nursing	
B.S. in Nursing (B.S. Nsg.)	134-137
Pharmacy	
B.S. in Pharmacy (B.S. Pharm.)††††	96
Physical Education	
B.S. in Physical Education (B.S.P.E.)	128
Physical Therapy	
B.S. in Physical Therapy (B.S.P.T.)	132
Social Work	
B.S. in Social Work (B.S.S.W.)	128

[6]Students matriculating with 58 or more hours of credit may graduate without credit for Physical Education, thus reducing the total hours required for graduation.

[7]For the degree of Bachelor of Science in Education, at least 10 hours of residence work must be in Education.

†Dentistry requires three years of successful undergraduate preparatory study, plus 142 required credit hours in the School of Dentistry, for an average seven-year program.

††An undergraduate degree is required for admission to the College of Law, plus successful completion of 81 credit hours within the College, for an average seven-year program.

†††Medicine requires a minimum of 90 credit hours of successful preparatory undergraduate study, plus completion of four years of prescribed study within the School of Medicine (including at least three quarters of clinical work at the conclusion of the third year and seven quarters of clinical work at the conclusion of the fourth year), for an average seven-year program.

††††Pharmacy requires two years (68 hours) of successful undergraduate preparatory study, plus 96 required hours in the School of Pharmacy, for an average five-year program.

SCHOLASTIC STANDING, ABSENCES, GRADE POINTS, ADVISERS, ACADEMIC STANDING, AND CHEATING

Grading System

A—excellent (given only to students of superior ability and attainment)
B—good (given only to students who are well above average, but not in the highest group)
C—fair (average students)
D—poor but passing
F—failure
I—incomplete
W—withdrawal prior to the end of the fifth week of a semester or withdrawal doing satisfactory work thereafter
WU—withdrawal doing unsatisfactory work (after the fifth week of a semester)
P—pass (see Pass-Fail Grading below)
X—auditor, no grade and no credit
CR—credit but no grade

Certain Approved Graduate Courses

S—Satisfactory
U—Unsatisfactory (equivalent to F)

Pass-Fail Grading

Certain students may elect to take one course each semester or Summer Session in which the grade earned will be either P (pass) or F (fail).

To be eligible, the student must be a full-time junior or senior enrolled in a baccalaureate program and must not exceed a total of 16 credit hours in courses graded by Pass-Fail only. In addition, the course selected for Pass-Fail grading must not be closed to undergraduate enrollment, required by the student's major or minor, or be part of the University Core Curriculum requirement.

The selection of a course for Pass-Fail grading must be made at registration with the approval of the student's academic adviser and may not be changed after the close of the registration period.

Absences

The student who is absent from class for any reason is responsible for work missed.

Students should understand that absences may jeopardize their grades or continuance in the course.

Instructors who use absence records in the determination of grades must announce this fact to students (in writing) within the first five class meetings.

It is the responsibility of the instructor to keep an accurate record of all students enrolled in his classes.

Instructors may report excessive absences to the student's dean or adviser.

Students who have been absent because of illness, authorized University activities, or other reasons approved by their deans, have the opportunity to make up regularly scheduled examinations.

Grade Points[8]

The grade-point average is computed on all work for which the student has registered, except for courses with grades of W, WU, P, and X and is based on the following grade-point values:

A	B	C	D	F	I	U
4	3	2	1	0	0	0

Provided, however, that when a student receives a grade of I and later removes the incomplete grade, his average grade-point standing shall be calculated on the basis of the new grade.

If the final grade of a student in any course is F, the student must take the course again in residence at the University if he desires to receive credit for it, unless the dean of the college or school authorizes the exception. The grade of I is given when an instructor believes that the course work is unavoidably incomplete or that a supplementary examination is justifiable. The grade of I must be removed within the following semester or the next semester in which the student is in residence, and becomes a failure unless special permission is granted by the appropriate Committee on Academic Standards to postpone removal.

Duties of Advisers

Each student entering the University is assigned an adviser whose duty is to assist students in preparing schedules, assign them to classes, and certify their study lists to the Dean of Admissions and Records. The adviser is expected to give to students assigned him such advice and sympathetic guidance as they may need in the pursuance of their work in the University. Students are expected to go freely to their advisers to discuss their problems.

All advisers, upon receipt of reports of excessive numbers of absences, shall have conferences with the students concerned and shall make such recommendations and adjustments as are desirable and feasible. If the adviser does not find a satisfactory solution after a conference with the student, he shall report the case to the dean of the college or school.

Uniform Academic Supension Regulations

Any undergraduate student in a baccalaureate curriculum whose total grade-point average is less than 2.0 but whose total grade-point deficiency is not large enough to cause him to be suspended, will be notified on his grade report from the Dean of Admissions and Records that his academic performance is unsatisfactory. Any further action or restriction is entirely the prerogative of the individual college.

Any undergraduate student in a baccalaureate curriculum with a grade-point deficiency which exceeds the maximum allowed by the uniform University regulation (see Table, page 46) shall be subject to academic suspension by the dean of his college. Academic suspension identifies the status of a student who

[8]For teacher certification the student is responsible for every registration in a course for which a grade of A, B, C, D, F, WU, P, or I is received. The University grade-point average is computed on all work attempted in all years.

Maximum Allowable Grade-Point Deficiency

Total Hours Attempted	Maximum Grade-Point Deficiency	Total Hours Attempted	Maximum Grade-Point Deficiency
0-20	32	61-65	12
21-25	26	66-70	12
26-30	20	71-75	11
31-35	19	76-80	10
36-40	18	81-85	9
41-45	17	86-90	8
46-50	16	91-95	7
51-55	15	96 and above	6
56-60	14		

has failed to meet the University minimum standards and who has been notified formally by the dean of his college of his academic suspension. A suspended student may not register for further work without prior approval of readmission by the Academic Standards Committee and the dean of his college. Action on academic suspension is to be taken by the appropriate dean at the end of each semester and such action is to be based on a special report from the Dean of Admissions and Records. The sequence of events in bringing about this action is:

1. The Dean of Admissions and Records will forward a special report at grade-reporting time to the college deans for appropriate action.
2. The Dean of Admissions and Records will provide the Provost for Instruction with a list of students subject to suspension in each college.
3. Deans will report to the Provost for Instruction the action taken on the students reported to them for academic suspension by the Dean of Admissions and Records.
4. A dean may suspend a student who fails to meet the requirements of academic probation set by the Committee on Academic Standards of his college.

Students who have been suspended may petition the Committee on Academic Standards of the college of enrollment after the next March 1st or October 1st to ascertain under what conditions, if any, they may be readmitted to that college.

A student suspended for academic reasons who fails to gain readmission to the college of his choice shall, upon application, be readmitted after one calendar year from the date of suspension, as a Remedial Studies student in the College of Arts and Sciences.

Suspension by these procedures shall be termed academic suspension and the regulations above supersede all other regulations for academic suspension.

Duties of Committee on Academic Standards

The Committee on Academic Standards shall have authority to proceed according to its best judgment in regard to students referred to it for consideration.

All orders of the committee shall become effective when approved by the dean of the college or school.

In the exercise of its authority the committee shall not suspend a student during a semester except for willful neglect and in cases where the student's class grades are so low that further class attendance would be a waste of time. No suspension shall become effective until approved by the dean of the college.

Procedural Rules for Handling Cheating Cases

Cheating is condemned at all levels and in all areas of life. Like a crippling malady, it leaves its mark subjectively. Cheating indicates a weakness and inability to meet and face the issues and problems of life. It creates an atmosphere of mistrust, disrespect, and insecurity. The effects and influence of cheating will necessarily be reflected in commerce and government and in all of the professions and callings, as well as in the classroom and in the home. Students of the University should act to discourage and eliminate cheating of every kind and character for the moral and mental well-being of themselves and their fellowmen. Likewise, the teaching faculty should remove and eliminate every situation which provides avenues and opportunities for cheating, thereby contributing to the inculcation of the principles of honesty, integrity, self-reliance and self-respect in students. It is expected that University officials will have little occasion to place in operation the established procedures for handling cheating cases. Through these procedures and by means of a continued awareness, on the part of both faculty and students, of the intellectually and morally weakening effects of cheating, a healthy strengthening of the moral fiber of the University may be envisioned and accomplished.

Cheating may be defined as including:

1. Obtaining help from another student during examination.
2. Knowingly giving help to another student during examination.
3. The use of notes, books, or any other unauthorized sources of information during examination.
4. Obtaining, without authorization, an examination or any parts thereof before taking the examination.
5. Submitting a report, notebook, speech, outline, theme, or other problem for credit that has been knowingly obtained or copied in whole or in part from another individual's academic composition, compilation or other product.
6. Submitting or participating in the submission of a report or examination paper falsely represented as being the result of the original efforts of the submitting student. [Plagiarism is a serious offense in whatever form it may appear, be it in the submission of an entire article falsely represented as the student's own, in the inclusion within a piece of his writing or an idea for which he has not provided sufficient documentation, or in the inclusion of a documented idea not sufficiently assimilated into the student's language and style. A student who has any questions about whether a particular inclusion in his work might constitute plagiarism should take upon himself the responsibility of requesting the aid and clarification of the instructor to whom he is submitting his work.]
7. Altering the record of any grade in any gradebook, office, or other record.

8. Any other type of misconduct, offense, or manifestation of dishonesty or unfairness in or relating to the academic work.

The deans of the several colleges and schools shall have the authority and shall be responsible for the handling of cheating cases arising or occurring within their respective colleges or schools.

Each member of the teaching faculty and all other University employees, including but not limited to assistants, proctors, office personnel, custodians and night watchmen, shall promptly report, via the department chairman or immediate superior, if any, each known case of cheating, as hereinbefore defined, to the dean of the college or school concerned.

Each case of cheating shall be handled with dispatch, and the dean shall promptly report thereon in writing to the President and shall at the same time place a copy of such report in the permanent record of the student concerned and forward another copy thereof to the Dean of Student Educational Services for his permanent records. The report shall include a brief statement covering the facts and circumstances of the case and the discipline applied or recommended.

In cases wherein cheating occurs in a college or school other than that in which the student is registered, the minimum penalty, as prescribed in the paragraph below, shall be applied by the dean of the college in which the cheating occurred. In handling such cases the dean shall follow the procedure in the above paragraph and then immediately refer the case, by transmittal of a copy of the report thereon as prescribed in the above paragraph, to the dean of the college or school in which the student involved is registered. The purpose of this copy of the report is for information and for imposition or recommendation of such further discipline or penalty as may be warranted. Upon completion of his review of and action on the case, the dean of the college or school in which the student is registered shall thereupon compose his independent written report on the case and transmit same to the President and otherwise distribute copies thereof as provided in the above paragraph.

The deans and their respective teaching faculties shall take remedial and preventive steps to remove every opportunity for any situation conducive to cheating. Particular attention shall be given to the maintenance of a high level of proctoring in those colleges, schools, and departments wherein proctoring is employed and to security against student access to or knowledge of examination and test materials prior to the time of the intended use thereof for student examination and testing purposes. The deans shall exercise their independent discretion as to methods and means of accomplishing these ends and may employ therefor faculty meetings, written instructions, or other effective devices and measures.

The *minimum* penalty for all cases of cheating shall be dismissal from the course and the establishment of a grade of F in the course, as of the date of cheating, *unless in the opinion of the dean there are extenuating circumstances which might indicate the advisability of a lesser penalty.* Where the grade of F in the course involved is a part of the penalty for cheating, that grade is to be entered on the student's permanent record and to remain there even though he withdraws from the course or from the University.

For a second or subsequent cheating offense, in addition to failure in the course, suspension or expulsion of the student shall be recommended by the dean for the President's action. The office of the Dean of Student Educational Services shall maintain its records of reports in cheating cases so as to detect and ascertain promptly and accurately the occurrence of second or subsequent cheating offenses and, upon inquiry by the dean, shall promptly advise whether the student has been guilty of any prior cheating offense or offenses.

Suspension or expulsion of a student guilty of cheating may, in first offense cases, be recommended by the dean to the President if the facts and circumstances of the case so warrant or the rules, regulations or policy of the college or school concerned so require.

In cheating cases involving criminal offenses, such as theft of examination or test materials, alteration of records, breaking or entering buildings, offices, desks, safes, or filing cabinets, damage to public property and other like or similar misconduct, the academic penalities and discipline as herein prescribed shall be applied and in addition thereto the dean of the college or school concerned shall, with the approval of the President, cause the facts of each case to be presented to the Prosecuting Attorney of Monongalia County, West Virginia, for his further investigation and for prosecution by injunction or otherwise as may be warranted. Upon the issuance of a warrant for or the return of an indictment against a student on account of any such offense, the President shall suspend such student from the University pending final prosecution thereon. If the student be acquitted of the offense, his suspension may be vacated, but if convicted of the offense, he shall be expelled from the University.

A student may appeal from the decision of action of a dean in a cheating case to the President for review and reconsideration and the President may thereupon affirm or reverse, in whole, or in part, the decision or action of the dean.

In his action on any cheating case, whether on appeal by a student or on recommendation or reference by a dean, the President may consider the case record before him, may further investigate or cause to be investigated the facts and circumstances of the case, and may act personally thereon and dispose thereof, or he may, in his discretion, refer the case to another appropriate University office, committee or agency for review, investigation, consideration and recommendation prior to his final action thereon and disposition thereof.

It is recommended that, in all phases of cheating cases, care and caution be observed so as to avoid accusation or charge of cheating or related impropriety which may be without foundation. A false accusation may have serious implications and result in reflection on or harm to an innocent and unoffending student and discredit to the faculty.

Downtown Campus.

Part 3
CURRICULA AND COURSES

PLAN FOR NUMBERING COURSES

For convenience, each course of study is designated by the name of the department in which it is given and by the number of that course. The plan for numbering is as follows:

Courses 1 to 99—Courses intended primarily for freshmen and sophomores.

Courses 100 to 199—Courses intended primarily for juniors and seniors.

Courses 200 *to* 299—Courses for advanced undergraduate students and selected graduate students. No more than 40 per cent of the credits counted for meeting requirements for a graduate degree can be at the 200 level.

Courses 300 *to* 399—Courses for graduate students; students in professional programs leading to the doctorate; and selected, advanced undergraduates. Undergraduates in any class carrying a 300 course number should have a 3.0 cumulative grade-point average and have written approval on special forms from their instructor and adviser and the Graduate School Dean. Seniors within 12 semester hours of graduation may, with prior approval on special senior petition forms of their adviser and Graduate School Dean, enroll in 300-level graduate courses. (In summary, 200-level courses are intended primarily to serve undergraduate students. If the graduate enrollment in a 200-level course with undergraduates enrolled regularly exceeds 25 per cent of the total, the department should reevaluate the course numbering. The 300-level courses are intended primarily to serve introductory graduate and master's degree course needs. If the undergraduate enrollment in any 300-level course regularly exceeds 20 per cent of the total, the department should also reevaluate the course numbering. Graduate degree credit hour requirements must include at least 60 per cent of the total at the 300 and 400 level.)

Courses 400 *to* 499—Courses for graduate students only. All doctor's degree dissertation hours shall be awarded at the 400 level—specifically under course number 497. Graduate degree credit hour requirements must include at least 60 per cent at the 400 and 300 level.

SCHEDULE OF COURSES

Before the opening of each semester, a *Schedule of Courses* is printed announcing the courses that will be offered by the colleges, schools, and divisions of WVU.

Landscape architecture class in planting design.

ABBREVIATIONS

I—a course given in the First Semester.
II—a course given in the Second Semester.
I, II—a semester course given in each semester.
I and II—a course given throughout the year.
S—a course given in the Summer Session.
hr.—number of credit hours per course.
rec.—recitation period.
lab.—laboratory period.
Conc:—concurrent registration required.
PR:—prerequisite.
Consent—consent of instructor required.

NOTE: Summer courses carry the same credit value as courses offered in the regular semesters.

College of Agriculture and Forestry

Robert S. Dunbar, Jr., Ph.D., *Dean of College of Agriculture and Forestry; Director of Agricultural Experiment Station, and Professor of Animal Science.*
Alfred L. Barr, Ph.D., *Director of Division of Animal and Veterinary Sciences and Professor of Agricultural Economics.*
Homer C. Evans, Ph.D., *Associate Director of Agricultural Experiment Station; Associate Dean of the College of Agriculture and Forestry, and Professor of Agricultural Economics.*
M. E. Gallegly, Ph.D., *Director of Division of Plant Sciences and Professor of Plant Pathology.*
K. D. McIntosh, Ph.D., *Director of Division of Resource Management and Professor of Agricultural Economics.*
David E. White, Ph.D., *Director of Division of Forestry and Professor of Forest Economics.*
Paul V. Armbrester, M.S., *Assistant to Dean for Academic Affairs and Assistant Professor of Agricultural Education.*
Edwin C. Townsend, Ph.D., *Assistant to Director for Research and Associate Professor of Statistics.*

Agriculture is a skill and a profession deeply rooted in sciences—biological, physical, political, and social. More than 39,000 U. S. scientists (15 per cent of all U. S. scientists) work in life sciences and agriculture in this day of sophisticated research, nucleonics, automation, atomic power, electronic computers, remote sensing, and aerospace travel. Agricultural science is, in fact, an essential force in the dynamic advances of the twentieth century.

Agriculture is a gigantic, vigorous, growing industry—stimulated to further growth by its myriad products and worldwide activity; $300 billion is invested in farms, equal to half the value of all corporate stocks on the New York Stock Exchange. Gross farm income exceeds $50 billion annually, up more than 300 per cent since the twenties. Assets of farm supply, processing, and distribution firms are $100 billion.

Each American farmer produces food for himself and approximately forty-four other persons. That's five times the output of a farmer fifty years ago. To what can we attribute this amazing advance? To agricultural research, industrial development, college instruction, extension education, and wise management.

Where are there more rewarding careers? Where can an individual make a greater contribution to the health, welfare, and well being of his fellowman?

The biggest boom in history is predicted for agriculture and related businesses because all nations are attempting to provide nutritionally adequate diets.

Agricultural graduates abound in foreign agriculture—both in governmental and private organizations, like the Rockefeller and Ford foundations. Three of the large employers—the Agency for International Development, the Food and Agriculture Organization of the United Nations, and the Peace Corps—have some 5,000 agriculturists in more than 100 countries.

Educational institutions, agribusinesses, and agriindustries in the United States need nearly 2,000 new scientists each year for positions in agricultural research and development. State agricultural experiment stations alone have 7,500 scientists conducting research.

More agricultural college graduates enter the educational field than return to farming. More than 2,000 jobs in education are filled annually by persons with degrees in agriculture. Each year a few more women and many more men from cities are among the 2,000.

In colleges where the life sciences and agriculture are taught, 19,500 professional and technical workers, besides 12,000 extension educators (a few in nearly every county), are employed. Add to that more than 11,000 high school agricultural instructors and the total exceeds 42,000 agricultural educators in the United States alone.

Industries allied with agriculture (including its manufacturing, processing, packaging, marketing, and supply segments) employ 32,000 professional and technical workers.

Thousands of firms assemble, process, and market farm crops, livestock products, and timber. More than 40 per cent of recent agricultural college graduates are employed by such firms. More persons are employed to transport, distribute, and market farm products than to produce them.

Specialized agriculture is becoming increasingly important. Examples include growing fruit and vegetables commercially; operating commercial woodlots; producing specialized dairy and poultry commodities; concentrating on livestock-feeding management; breeding purebred and crossbred livestock; producing seed and nursery stock. Some agriculturists grow such specialty crops as sugar beets, cotton, rice, pecans, or peanuts; fruit and vegetables for canning and freezing; turf for lawns and golf courses; or greenhouse flowers and vegetables.

A lifetime career in agriculture could open new, challenging opportunities to you—in business, industry, research and development, education, communications, pollution abatement, resource development, economic development in foreign countries, conservation, recreation, or urban agriculture.

Agriculture is science—biological, social, and physical. That is the reason agriculture needs college-educated men and women, ideally from all ethnic backgrounds.

Forestry—The field of forestry also is very broad. The professional forester's work includes such diversified activities as timber production, logging, surveying, timber estimating, park management, forest protection, forest-stand improvement, flood control, watershed protection, soil erosion control, submarginal land development, restoration of game, forest-game management, stream development, lumber dry-kiln operation, plywood and furniture manufacture, timber preservation, construction of public camps and summer homesites, and recreation.

There are now more than 20,000 professional foresters in the United States, and the need for additional foresters increases each year.

Students in the College of Agriculture and Forestry study and work under an outstanding faculty. Most of the faculty members hold joint appointments in the Agricultural Experiment Station, where they are constantly engaged in

important basic and applied research . . . activities that help them to keep abreast of advances being made in their fields. This in turn they pass on to their students.

History

The College of Agriculture was established as a distinct college in the University in 1895. The Agricultural Experiment Station was founded in 1888 and became part of the College in 1895. A four-year course in forestry was added in 1937.

The College of Agriculture and Forestry is organized into five units. These are the Divisions of Animal and Veterinary Sciences, Forestry, Plant Sciences, Resource Management, and the Agricultural Experiment Station.

The College has undergone many changes over the years—all designed to upgrade instruction and to keep in tune with the ever-changing trends in agriculture and forestry.

Programs of Study

The College of Agriculture and Forestry offers sixteen general programs of study—nine in agriculture and seven in forestry.

Students in agriculture may pursue courses leading to a broad education that can prepare them for a variety of careers, or they can specialize in such areas as Agricultural Education, Agricultural Mechanics, Agronomy (Forage and Grain Crops, Soil Science, and Conservation), Animal Science and Industry (Dairy, Livestock, and Poultry), Horticulture (Ornamentals, Fruits, Vegetables, and Soils).

The College also offers programs in Agribusiness, Landscape Architecture, and Pre-Veterinary Medicine.

Students in the Division of Forestry may select a major from the following curriculum options: Forest Resources Management, Forest Science, Wood Industries, Wood Science, Wildlife and Fishery Management, Recreation Resources Management, or Recreation.

Much of the emphasis in the College is placed on preparing students for work in graduate and professional schools. For example, the Bachelor of Science curriculum provides the student an opportunity to gain the necessary background in preparation for such study.

Facilities

Faculty offices, classrooms, and laboratories are in the Agricultural Sciences Building and the Agricultural Engineering Building, completed in 1960, and in the Forestry Building, completed in 1965. All components of the College, except Plant Pathology and Bacteriology which is located in Brooks Hall, are housed in these modern facilities.

These facilities include specially designed classrooms and laboratories, faculty and graduate student offices, student lounges, and reading rooms. The Agricultural Sciences Building has a spacious auditorium, and a complete and modern meat laboratory and creamery. Horticultural greenhouses for research and study purposes are located within a few steps of the building. Plant

Pathology greenhouses are located near Brooks Hall. The Agriculture-Engineering Library is located in the Engineering Sciences Building.

The Agricultural Experiment Station, the research arm of the College, is located in the Agricultural Sciences Building. From this base the College extends its research functions all over the state. For example, the College has 900 acres of land for research farms within a short distance of the Morgantown campuses. This land is divided into five farms—dairy, livestock, horticulture, agronomy, and poultry—with modern farm and special buildings for classroom, experiment, and laboratory work.

Branch experiment stations are maintained at key locations throughout the state:

Wardensville—Reymann Memorial Experimental Farms was established in 1917. This 987-acre farm, located on the Cacapon River in Hardy County, is operated on an experimental basis involving pasture improvement, erosion control, soil rebuilding, water conservation, irrigation, crops, beef cattle, sheep, and poultry.

Point Pleasant—This 150-acre tract, known as the Ohio Valley Experiment Farm, is located on the Ohio River. It was acquired by WVU in 1948 and is operated as a unit for experimental work in tobacco and truck and field crops of special interest to farmers of the Ohio and Kanawha valleys.

Kearneysville—The University Experiment Farm, 158 acres in the eastern section of West Virginia, was established in 1930 for the study of problems relating to fruit production, including insect and disease control, as well as problems of general farming typical to that section.

Reedsville—The Reedsville Experiment Farm consists of 475 acres in Preston County. Research is conducted there on potatoes, ornamentals, small fruits, corn and legumes in rotations, pasture and livestock.

The College also maintains approximately 13,600 acres of forest land throughout the state—experimental and teaching laboratories of the Division of Forestry. The University Farm Woods, 100 acres of mature timber, is only two miles from the campus. A recent acquisition, the 2,100-acre A. C. Hoyt Experimental Forest, is situated in Wetzel County, only an hour's drive from Morgantown.

The College has a long-term lease for the West Virginia University Forest, a 7,500-acre tract of the 13,000-acre Coopers Rock State Forest, less than ten miles from the University. Other major tracts are located in Mingo, Randolph, and Raleigh counties.

Student Activities

Students in the College gain valuable learning and practical experiences outside the classroom and laboratory through participation in what is popularly called extracurricular activities. A variety of such activity is available to students at both College and University levels.

Some activities are closely associated with classroom work—for example, the College judging teams. These teams compete with judging teams from all over the United States. Teams open to students who qualify are dairy cattle, dairy products, flower, fruit, livestock, meats, soil, and vegetable.

Students may join one or more of several service clubs in the College including:

Blade and Spade Club—open to all students interested in crop and soil sciences.

Block and Bridle Club—for students majoring in animal science or those with an interest in that field.

Dairy Science Club—for students interested in furthering their knowledge of dairy production and foods.

Forestry Club—forms an important part of each forestry student's program.

University 4-H Club—for all students interested in upholding 4-H ideals.

Honorary and professional organizations in the College are:

Ag Council—open to all students interested in the betterment of agriculture. It is the combining club for all students in agriculture.

Alpha Tau Alpha—national agricultural education professional honorary fraternity.

Alpha Zeta—honorary agricultural fraternity for agriculture and forestry students, instituted in the College in 1921.

American Society of Agricultural Engineers—open to agricultural mechanics students.

Collegiate Chapter of Future Farmers of America—for all former FFA members and students preparing to teach vocational agriculture.

Forest Products Research Society—open to students in wood industry and wood science.

Gamma Sigma Delta—honor society of agriculture. Outstanding individuals of senior class, graduate students, faculty and alumni of the College are elected to membership by faculty.

National Audubon Society—open to all University students interested in conservation.

Society of American Foresters—professional forestry society.

Student Society of Landscape Architecture—open to landscape architecture students and any University student who is actively interested in that field.

West Virginia University Professional Recreation and Parks Society—open to students in Recreation and Recreation Resources Management Curricula.

West Virginia University Student Chapter of the Soil Conservation Society of America—membership open to any full-time student in the University.

West Virginia University Student Chapter of the Wildlife Society—open to all students in the University.

Xi Sigma Pi—national forestry honorary fraternity.

COLLEGE REGULATIONS

Students in the College of Agriculture and Forestry must comply with University regulations dealing with scholarship. Specific regulations that apply to the College are described in the following sections.

Credit Load Per Semester

The minimum work per semester is 14 credit hours and the maximum work per semester is 20 hours. Exceptions to this regulation are:

A student in his first semester of enrollment may reduce his course load to 12 semester hours with the approval of his adviser.

An adviser may register a student as a part-time student if less than 14 hours are required to meet all requirements for the bachelor's degree.

Any additional exceptions to these regulations may be obtained by petitioning the Committee on Academic Standards.

Student Petitions

Petitions may be submitted to the Committee on Academic Standards: (a) to register for more than maximum hours regularly allowed; (b) to register for less than minimum load; (c) to drop courses after the regular withdrawal date; (d) for reentry after scholastic suspension, and (e) to transfer into the College with a grade-point deficiency accumulated in another college.

Petitions should be prepared on special forms and must include the recommendation of the student's adviser.

Barring unusual and unforeseen circumstances, a student is under obligation to complete the courses in which registration was made. Failure in a course at mid-semester does not constitute a reason for withdrawal.

Students may appear in person before the Committee on Academic Standards in support of their petitions.

Students may appeal decisions of their advisers, Academic Standards Committee, and Division Director to the Dean.

Students should submit petitions at an early date. Delay may result in denial because sufficient evidence may not be available.

Notice of the recommendation by the Committee on Academic Standards regarding a petition, after approval by the Dean, shall be sent to the student, to his adviser, and the Director of the Division in order that the report can be filed with the student's academic records.

Grade-Point Deficiencies

Academic Warning

A student with a grade-point deficiency which is not so large as to cause suspension shall be placed on academic warning. Each student shall be advised in writing of his academic status by the Dean and referred to the appropriate Division Director for additional counsel and guidance. Copies of the letter shall be sent to the parent or guardian, the adviser, the Director, and the official file of the student.

A student with a grade-point deficiency shall not enroll for more than 15 hours.

Academic Probation

Students who have been reinstated after suspension and students who have transferred from another college with less than a 2.0 grade-point average shall be placed on academic probation until their grade-point deficiency is reduced to a level less than the maximum allowable without suspension. At such time the student will be reassigned to an adviser by the appropriate Division Director.

While on academic probation a student shall be required to maintain a minimum grade-point average of 2.25 in order not to be suspended.

The Chairman of the Committee on Academic Standards shall serve as adviser to all students on academic probation.

Academic Suspension

Any student whose grade-point deficiency exceeds the maximum allowed by these regulations shall be subject to suspension. The student shall be notified of suspension in writing by the Dean. Copies of the letter shall be sent to the Dean of Admissions and Records, Director of Housing, the appropriate Division Director, the parent or guardian, the adviser, and the official file of the student.

Any student on academic probation whose grade-point average at the end of a period of enrollment is less than 2.25 for that period of enrollment shall be suspended. Letters of notification shall be distributed as described above.

Students who have been suspended are advised to petition the Committee on Academic Standards after March 1 or October 1 to ascertain under what conditions, if any, they may be reinstated.

AGRICULTURE

11. **Professions in Agriculture.** I. 1 hr. Survey of the subject-matter disciplines and of the career opportunities available to agriculture graduates. Students study all the dimensions of the industry of agriculture.

12. **Professions in Agriculture.** II. 1 hr. Continuation of Agr. 11.

190. **Man and Food.** (Same as Sociology 190.) I. 3 hr. An exploration on a global basis of the interactions between man and his environment as reflected in his food supply and in turn the development and maintenance of his social and political institutions.

200. **Agriculture Travel Course.** S. 6 hr. Tour and study of production methods in major livestock and crop regions of the United States and other countries. Influence of population, climate, soil, topography, markets, labor, and other factors on agriculture production.

AGRICULTURE AND FORESTRY

190. **Professional Development.** I, II, S. 1 hr. per sem. PR: Cooperative education commitment. Evaluation of Cooperative education experience in an independent work-study program.

AGRICULTURAL BIOCHEMISTRY

Interdivisional Committee of Agricultural Biochemistry

David A. Stelzig, Ph.D. (N.D. St. U.), *Chairman and Associate Professor of Agricultural Biochemistry and Associate Agricultural Biochemist.*

Bradford C. Bearce, Ph.D. (U. Calif.), *Associate Professor of Horticulture and Agricultural Biochemistry and Associate Horticulturist.*

James L. Brooks, Ph.D. (U. Calif.), *Associate Professor of Agricultural Biochemistry and Associate Agricultural Biochemist.*

L. Morris Ingle, Ph.D. (Purdue U.), *Associate Professor of Horticulture and Agricultural Biochemistry and Associate Horticulturist.*

Walter J. Kaczmarczyk, Ph.D. (Hahnemann Med. C.), *Associate Professor of Genetics and Agricultural Biochemistry and Associate Geneticist.*
George A. McLaren, Ph.D. (Okla. St. U.), *Professor of Nutritional Biochemistry and Agricultural Biochemist.*
William G. Martin, Ph.D. (WVU), *Associate Professor of Agricultural Biochemistry and Associate Agricultural Biochemist.*
Homer Patrick, Ph.D. (Penn. St. U.), *Professor of Agricultural Biochemistry and Agricultural Biochemist.*
Robert L. Reid, Ph.D. (Aberdeen U.), *Professor of Animal Nutrition and Agricultural Biochemistry and Nutritionist.*
Eion G. Scott, Ph.D. (U. Calif.), *Professor of Horticulture and Agricultural Biochemistry and Chairman of Horticulture and Horticulturist.*
Valentin Ulrich, Ph.D. (Rutgers U.), *Professor of Genetics and Agricultural Biochemistry and Geneticist.*

Agricultural Biochemistry

180. **Assigned Topics.** I, II. 1-4 hr.

210. **Introductory Biochemistry.** I, II. 3 hr. PR: Two semesters of General Chem. and one semester of Organic Chem. The biochemistry of the proteins, carbohydrates, lipids, nucleic acids, enzymes, coenzymes, and cellular metabolism in plants and animals.

212. **Animal Biochemistry.** II. 3 hr. PR: One semester of biochemistry. Nutritional and physiological chemistry of domestic animals.

213. **Introductory Biochemistry Laboratory.** II. 2 hr. PR or Conc.: Agr. Biochem. 210. A laboratory course in nutritional biochemistry.

Division of Animal and Veterinary Sciences

Faculty

Alfred L. Barr, Ph.D. (Okla. St. U.), *Director, Division of Animal and Veterinary Sciences and Professor of Agricultural Economics and Agricultural Economist.*
O. J. Abbott, Ph.D. (U. Wisc.), *Professor of Poultry Science (Makerere University, Kampala, Uganda).*
Gerald C. Anderson, Ph.D. (U. Mo.), *Professor of Animal Science and Animal Husbandman.*
C. J. Cunningham, Sr., B.S. (VPI), *Professor of Animal Science; Animal Husbandman in Charge, Reymann Memorial Farms, Wardensville.*
Leslie Dozsa, D.V.M. (C. Vet. Med., Budapest), *Professor of Veterinary Science and Animal Pathologist.*
Robert S. Dunbar, Jr., Ph.D. (Cornell U.), *Professor of Animal Science and Dean of College of Agriculture and Forestry.*
Joseph C. Emch, M.S. (Okla. St. U.), *Associate Professor and State Extension Specialist—Animal Science.*
Rush C. Hatch, B.S. (WVU), *Dairy Farm Manager.*
James O. Heishman, B.V.Sc., V.S. (U. Toronto), *Associate Professor and Associate Animal Pathologist, Reymann Memorial Farms, Wardensville.*
Donald J. Horvath, Ph.D. (Cornell U.), *Professor of Animal Science and Animal Husbandman.*
E. Keith Inskeep, Ph.D. (U. Wisc.), *Professor of Animal Science and Animal Scientist.*
William T. Jones, B.S. (WVU), *Poultry Farm Manager.*
Robert O. Kelley, Ph.D. (U. Mo.), *Associate Professor and State Extension Specialist—Dairy Science.*
Harold E. Kidder, Ph.D. (U. Wisc.), *Professor of Animal Science and Animal Husbandman.*

Edwin A. Linger, B.S. (WVU), *Instructor and Livestock Farm Manager.*
Marvin R. McClung, Ph.D. (Iowa St. U.), *Professor of Animal Science and Animal Scientist.*
Dean L. McIlroy, Jr., Ph.D. (Cornell U.), *Professor of Animal Husbandry (Makerere U., Kampala, Uganda).*
George A. McLaren, Ph.D. (Okla. St. U.), *Professor of Nutritional Biochemistry and Agricultural Biochemist.*
William G. Martin, Ph.D. (WVU), *Associate Professor of Agricultural Biochemistry and Associate Agricultural Biochemist.*
Byron W. Moore, M.S. (WVU), *Associate Professor and State Extension Specialist—Poultry Science.*
Norman O. Olson, D.V.M. (Wash. St. U.), *Professor of Veterinary Science and Veterinarian.*
Homer Patrick, Ph.D. (Penn. St. U.), *Professor of Agricultural Biochemistry and Agricultural Biochemist.*
John B. Peters, Ph.D. (U. Wisc.), *Associate Professor of Animal Science and Associate Animal Scientist.*
Ronald A. Peterson, Ph.D. (Mich. St. U.), *Associate Professor of Poultry Science and Associate Poultry Scientist.*
Stephen Powell, M.S. (Purdue U.), *Instructor in Meat Science and Research Assistant.*
Robert L. Reid, Ph.D. (Aberdeen U.), *Professor of Animal Science and Nutritionist.*
John H. Rietz, D.V.M. (Ohio St. U.), *Professor Emeritus of Veterinary Science and Animal Pathology.*
John R. Schabinger, Ph.D. (N.C. St. U.), *Professor and Area Extension Specialist—Dairy Science.*
Paul M. Smith, M.S. (Penn. St. U.), *Instructor in Dairy Science and Supervisor of Dairy Processing.*
William V. Thayne, Ph.D. (U. Ill.), *Assistant Professor of Dairy Science and Assistant Dairy Scientist.*
Roy O. Thomas, Ph.D. (Mich. St. U.), *Associate Professor of Dairy Science and Dairy Scientist.*
A. H. VanLandingham, Ph.D. (WVU), *Professor Emeritus of Agricultural Biochemistry.*
Benjamin W. Wamsley, Jr., M.S. (WVU), *Associate Professor and State Extension Specialist—Animal Science.*
James A. Welch, Ph.D. (U. Ill.), *Professor of Animal Science and Animal Husbandman.*
Frank E. Woodson, D.V.M. (Ohio St. U.), *Associate Professor of Veterinary Science.*

Division of Animal and Veterinary Sciences (Dairy, Livestock, and Poultry)

Students taking programs in this Division may work towards degrees which enable them to do graduate work, go into commercial agriculture, work for federal or state agencies, the food processing industry and other areas of food and agriculture. The program in Pre-Veterinary Medicine provides requirements for entry into veterinary colleges. Many pre-veterinary students obtain their bachelor's degrees along with meeting veterinary school requirements.

Students taking programs in the division will take courses in breeding, nutrition, pathology, food science, and animal production. To assist in equipping themselves for the many varied careers in animal agriculture, students take supporting courses in other divisions of the College of Agriculture and in other colleges. These include courses such as agricultural biochemistry, mathematics, chemistry, biology, finance, business law, and accounting. The

programs are flexible enough to permit the student to obtain a broad background and take enough courses in an area the last two years to prepare for the first job.

Bachelor of Science

The curriculum in science, with its flexible design, will provide the student with the opportunity to acquire the necessary background in agricultural biochemistry, mathematics, chemistry, physics, and modern concepts of biology in preparation for professional or graduate study in such fields as agricultural biochemistry, animal breeding, animal physiology, nutrition and pathology. Selection of individual courses is the responsibility of the student in consultation with his adviser. The student must complete a minimum of two courses each in biology, chemistry, and physics and must complete mathematics through calculus. The pre-professional student may substitute chemistry for calculus to meet degree requirements.

Requirements	*Hours*
English Composition and Rhetoric (or conformity with WVU English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences* (Group C included) (A minimum of two courses in each of biology, chemistry, physics, and mathematics through calculus is required.)	40
Courses in the College of Agriculture and Forestry	24
Physical Education	2
Free Electives**	32
Total	128

*The pre-professional student may substitute advanced chemistry courses for calculus to meet degree requirements. This ordinarily means a minimum of 12 hours of chemistry in addition to the required courses. The 40 hours of natural sciences are exclusive of the courses offered in the College of Agriculture and Forestry.

**The pre-professional student may substitute advanced chemistry courses for calculus to meet degree requirements. This ordinarily means a minimum of 12 hours of chemistry in addition to the required courses.

Bachelor of Science in Agriculture

The curriculum of Bachelor of Science in Agriculture will provide the student with the opportunity to acquire the necessary background in biochemistry, nutrition, breeding, physiology, pathology, agricultural economics and agronomy to become prepared for a career in animal, dairy or poultry production and management. There are also food science courses available under the curriculum for those students who are interested in preparing for opportunities in food processing related to dairy, poultry and meat products.

Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C included) (Must elect a minimum of 8 credits in biology; 8 credits in chemistry; 3 credits in college algebra or equivalent, exclusive of courses offered in Agriculture and Forestry.)	24
Courses in Agriculture	45
Elect a minimum of 3 credits in each of the following: 1. Animal Science 2. Plant Science 3. Soil Science 4. Agricultural Economics	
Elect additional courses to obtain a total of 45 credits in Agriculture.	
Physical Education	2
Free Electives	35
Total	136

Courses of Instruction

Animal and Veterinary Science

51. **Principles of Animal Science.** I. 4 hr. A comparative study of the production of meat, milk, eggs, and wool. Nutrition, physiology, genetics, hygiene, physical environment, and economics are discussed as bases for sound managerial decisions.

180. **Assigned Topics.** I, II, S. 1-4 hr. per. sem. In order to be eligible to register in Assigned Topics 180, the student must: (1) be in good standing, and (2) obtain approval of the Division prior to registration.

195. **Seminar.** II. 1 hr. Senior seminar.

Pre-Veterinary Medicine Program

This is a program designed to prepare students for entry into professional schools or colleges of veterinary medicine. West Virginia has an arrangement with Ohio State University, Oklahoma State University, and Tuskegee Institute, whereby each institution may accept annually up to 6, 3, and 1 students, respectively, into their colleges of veterinary medicine. In order to qualify for these positions the students must have been West Virginia residents for at least the past five years. Students may apply to any of the 19 other veterinary schools in the United States and Canada for admission.

Applicants for admission to these colleges of veterinary medicine must present at least 60 semester hours of acceptable credit. Since a maximum of ten eligible students are accepted each year, alternate goals in either of the other degree programs are urged for all pre-professional students.

Applicants with a grade-point average of 3.0 or above will be given first consideration for admission to these institutions.

A student who has completed 90 hours of course work at WVU, or 90 hours at institutions within the West Virginia state system of higher education, including at least 36 at WVU, and has completed all required courses for the degree may transfer credit from a veterinary college to WVU and receive his bachelor's degree.

The *equivalent* of the following pre-professional courses is required of all applicants for admission without condition to a college of veterinary medicine.

	Hours
Agricultural Orientation	2
English	6
Chemistry (Inorganic)	8
Chemistry (Organic)	8
Biology	8
Principles of Heredity	4
Mathematics	3
Physics*	8
Speech, Humanities, and Social Science**	12
Electives	9
Total	68

*The physics courses required at The Ohio State University have a prerequisite of trigonometry. Thus trigonometry is required for the student planning to attend Ohio State University.
**Students applying to Oklahoma State University must include a three-hour course in speech.

Animal Nutrition

101. **Animal Nutrition.** I, II. 3 hr. PR: Two courses in chemistry. Digestion and metabolism of food nutrients, nutrient requirements of farm animals, and nutritive values of feeds and rations.

294. **Poultry Nutrition.** II. 3 hr. (1 lab.). PR: An. Nutr. 101. Nutritional requirements, nutrient interrelationships, and nutritional deficiencies of all types of domesticated fowl.

301. **Principles of Nutrition and Metabolism.** I. 3 hr. PR: Agr. Biochem. 210, An. Physiol. 100 or equiv. A basic course in animal nutrition.

305. **Comparative Nutrition and Metabolism.** II. 3 hr. PR: An. Nutr. 301 or consent. A comparative study of the utilization of dietary nutrients by species of laboratory and domestic animals and man. (Offered in odd years.)

306. **Nutrition Laboratory Methods.** II. 3 hr. PR or Conc.: An. Nutr. 301. Chemical, physical, and biological methods used in animal nutrition research.

Animal Physiology and Breeding

100. **Introduction to the Physiology of Domestic Animals.** I. 3 hr. PR: Biol. 1 or consent. The function and regulation of the principal systems of the animal body.

204. **Animal Physiology Laboratory.** I. 2 hr. PR or Conc.: An. Physiol. 100. Laboratory study of the physiological systems of animals and the influences of environment on these systems.

225. **Physiology of Reproduction.** II. 3 hr. PR: Course in Biology. Comparative physiology of reproduction in higher animals; endocrine function involved in reproduction; genetic and environmental variations in fertility mechanisms.

226. **Breeding of Farm Animals.** I. 3 hr. PR: Course in Genetics or consent. Application of principles of quantitative genetics to the improvement of farm animals.

280. **Behavioral Patterns of Domestic Animals.** II. 3 hr. (1 lab.). Examination of the bases for and exhibition and control of behavioral patterns of domestic animals.

NOTE: Students also are referred to Biol. 266 (Human Physiology) and 267 (Comparative Physiology).

Animal Production

108. **Animal Production Experience.** I, II, S. 1 hr. (3 hr. lab.). A maximum of 4 credit hours may be earned by enrolling in this course. Experience in operating a poultry, dairy, or livestock farm, including trapnesting, incubation, and pedigreeing poultry; feeding, handling, calving, lambing, or farrowing of dairy and beef cows, sheep, and hogs.

137.° **Dairy Cattle History and Selection.** II. 3 hr. (2 labs.). To familiarize the student with the history, development and programs of the breeds of dairy cattle as well as the modern concepts in phenotype and performance record evaluation.

138.° **Grading and Selection of Meat and Meat Animals.** II. 3 hr. (2 labs.). Appraisal of live meat animals, carcasses and cuts; and the evaluation of scientific techniques used in selecting meat animals and evaluating carcass meat.

139.° **Selection, Evaluation, and Grading of Meat Animals, Carcasses and Cuts.** I. 2 or 4 hr. PR: An. Prod. 138 and consent. Evaluation of breeding merit and potential carcass characteristics of red meat animals; evaluation of meat quality and other factors affecting the marketability of meat. Tours of representative flocks, herds, and packing plants will be required.

141.° **Beef Production.** I. 3 hr. (1 lab.). PR: An. Nutr. 101. Physiological and economical bases of beef production.

142.° **Pork Production.** II. 3 hr. (1 lab.). PR: An. Nutr. 101. Physiological and economical bases of pork production. (Offered in even years.)

144. **Light Horse Science.** II. 3 hr. (1 lab.). The application of breeding, nutrition, physiology, and pathology to production and management of light horses.

145. **Milk Production.** II. 3 hr. (1 lab.). Feeding and management of dairy cattle.

146. **Sheep Production.** II. 3 hr. (1 lab.). PR: An. Nutr. 101. Physiological and economical bases of sheep production. (Offered in odd years.)

240. **Advanced Poultry Production.** I. 3 hr. (1 lab.). PR: Course in Animal Nutrition. Special phases of broiler and egg production, disease control, laborsaving studies, and recent designs in building and heating equipment for all types of poultry. (Offered in even years.)

°Transportation for required trips in connection with these courses will generally be supplied by the College. Students will be responsible for their meals and lodging.

250. **Current Literature in Animal Science.** I. 3 hr. (1 lab.). PR: An. Nutr. 101. Evaluation of current research in animal science and its application to production and management.

Food Science

106. **Poultry Products Technology.** I. 2 hr. (1 lab.). To familiarize the student with poultry and egg grades, and factors and conditions that determine and influence the quality of poultry products. (Offered in odd years.)

107. **Milk and Public Health.** I. 3 hr. (1 lab.). Food value of milk and its production and processing in relation to public health. (Offered in odd years.)

112. **Dairy Technology.** II. 3 hr. (1 lab.). Introductory. Composition and properties of milk and milk products; butterfat testing; manufacture of dairy products. (Offered in odd years.)

130. **Market Milk Products and Frozen Desserts.** I. 4 hr. (1 lab.). The assembling, processing, packaging, storing and mechandising of dairy products. (Offered in even years.)

134. **Judging Dairy Products.** II. 2 hr. (2 labs.). A laboratory course in evaluating and judging dairy products.

167.° **Meats.** I. 3 hr. (2 labs.). Processing, curing, and care of meats. Visit to one of the large packing houses of Pittsburgh required.

267.° **Advanced Meats.** II. 3 hr. (2 labs.). PR: Food Sci. 167. Studies covering composition of meat, complete fabrication of meat animal carcasses, factors influencing yield, physiology and chemistry of pertinent phenomena, and merchandising of meat. (Offered in even years.)

Veterinary Science

102. **Animal Pathology.** II. 3 hr. Diseases of domestic animals, with special emphasis on the common diseases.

210. **Principles of Laboratory Animal Science.** I. 3 hr. (1 lab.). PR: Consent for undergraduates. The management, genetics, physiology, nutrition, disease, and germ-free quartering of common laboratory animals.

301. **Surgery.** (Same as Surg. 301.) I. 3 hr. (1 lab.). Introduction to laboratory animal experimentation.

306. **Parasitology.** II. 3 hr. PR: Course in Biology. Common parasites of farm animals, their control, and their effect upon the host. (Offered in odd years.)

Division of Forestry

Faculty

David E. White, Ph.D. (S.U.N.Y.), *Director, Division of Forestry and Professor of Forest Economics.*

Van F. Anderson, M.S. (WVU), *Lecturer in Recreation.*

George H. Breiding, B.S. (Ohio St. U.), *State Extension Program Leader—Outdoor Recreation and Assistant Professor of Forestry.*

Samuel M. Brock, Ph.D. (U. Minn.), *Professor of Forest Economics.*

Maurice G. Brooks, M.S. (WVU), *Professor Emeritus of Wildlife Management.*

Kenneth L. Carvell, D.For. (Duke U.), *Professor of Silviculture and Silviculturist.*

Franklin C. Cech, Ph.D. (Tex. A & M U.), *Professor of Forest Genetics and Forest Genecticist.*

John D. Gill, M.S. (Mich. St. U.), *Assistant Professor of Wildlife Management.* (*Wildlife Biologist, U. S. Forest Service Forestry Sciences Laboratory.*)

Allen W. Goodspeed, M.F. (Yale U.), *Professor Emeritus of Forest Management.*

William H. Goudy, M.S. (Mich. St. U.), *Assistant Professor of Wildlife Management.* (*Supervisor of Game Research, West Virginia Department of Natural Resources.*)

William N. Grafton, M.S.F. (WVU), *Assistant Professor and Area Extension Specialist—Forestry.*

Carter S. Hall, M.B.A. (WVU), *State Extension Specialist—Forest Industries and Assistant Professor.*

John R. Hamilton, Ph.D. (N.C. St. U.), *Professor of Wood Science and Wood Scientist.*

William M. Healy, B.S. (Penn. St. U.), *Instructor in Wildlife Management.* (*Wildlife Biologist, U. S. Forest Service Forestry Sciences Laboratory.*)

Joseph M. Hutchison, Jr., M.S. (WVU), *Associate Professor of Recreation.*

Norman D. Jackson, M.W.T. (N.C. St. U.), *Assistant to the Director, Associate Professor of Wood Science and Associate Wood Scientist.*

Etley P. Jenkins, M.S. (WVU), *Assistant Professor of Wood Science and Assistant Wood Scientist.*

Laszlo O. Keresztesy, Ph.D. (U. London), *Research Associate in Wood Science and Associate Professor of Civil Engineering.*

William E. Kidd, Jr., M.S. (VPI), *State Extension Specialist, Forest Management, and Associate Professor.*

Christian B. Koch, Ph.D. (U. Mich.), *Professor of Wood Science and Wood Scientist.*

Richard Lee, Ph.D. (Colo. St. U.), *Professor of Forest Hydrology and Forest Hydrologist.*

William R. Maxey, M.S.F. (WVU), *Assistant Professor of Forest Management and Forest Manager.*

Edwin D. Michael, Ph.D. (Tex. A & M U.), *Associate Professor of Wildlife Management and Associate Wildlife Biologist.*

W. Clement Percival, Ph.D. (S.U.N.Y.), *Professor Emeritus.*

David E. Samuel, Ph.D. (WVU), *Assistant Professor of Wildlife Management and Assistant Wildlife Biologist.*

H. Reed Sanderson, M.S. (Colo. St. U.), *Assistant Professor of Wildlife Management.* (*Wildlife Biologist, U. S. Forest Service Forestry Sciences Laboratory.*)

William M. Santonas, B.S. (Ohio U.), *Instructor in Wildlife Management.* (*Supervisor of Resources Planning, West Virginia Department of Natural Resources.*)

Bruce A. Schick, Ph.D. (S.U.N.Y.), *Assistant Professor of Forest Economics and Assistant Forest Economist.*

Robert L. Smith, Ph.D. (Cornell U.), *Professor of Wildlife Management and Wildlife Biologist.*

Susan C. Smith, B.S.Rec. (WVU), *Instructor in Recreation and Assistant in Recreation.*

Hans-Peter Steinhagen, Diplo-Holzwirt (U. Hamburg), *Assistant Professor of Wood Science and Assistant Wood Scientist.*

Anthony C. Tomkowski, M.S. (WVU), *Instructor in Forestry.*
George R. Trimble, Jr., B.S.F. (U. Maine), *Assistant Professor of Forest Management. (Project Leader, Timber Management Research, U. S. Forest Service, Parsons Timber and Watershed Laboratory.)*
Earl H. Tryon, Ph.D. (Yale U.), *Professor of Silviculture and Silviculturist.*
Ben W. Twight, Ph.D. (U. Wash.), *Assistant Professor of Forest Recreation.*
Harry V. Wiant, Ph.D. (Yale U.), *Professor of Forestry and Forester.*
William L. Wylie, M.S. (WVU), *Assistant Professor of Forest Recreation.*
Vern P. Yerkes, M.S.F. (Ore. St. U.), *Instructor. (Forest Products Technologist.)*
Joseph N. Yeager, M.S. (WVU), *Instructor in Forestry and Area Extension Specialist—Forestry.*
Gary W. Zinn, Ph.D. (S.U.N.Y.), *Assistant Professor of Forest Management.*

Why a Career in Forestry?

A career in forestry provides personal satisfaction from feeling that your work is important to society, and an opportunity to utilize your education in an out-of-doors environment. Forestry is the oldest professional field in this country whose primary concern is the conservation of natural resources. There are more than 20,000 professional foresters in the United States and the need for intelligent management of forests for wood crops, water, wildlife, and recreation will increase as population grows.

The professional forester must combine a scientific knowledge with ability to manage both people and financial affairs. His decisions often affect the lives of thousands of people and they may determine the success or failure of a multi-million dollar enterprise.

A graduate forester entering federal employment can expect a starting salary of from $6,548 to $9,679 per year. Salaries in state employment are generally somewhat below those of similar federal positions. Salaries in private industry are usually somewhat higher. Foresters hold key executive positions in government and industry where salary is commensurate with responsibility.

Forestry at West Virginia University

West Virginia University is one of thirty-three schools in the United States whose forestry programs are accredited by the Society of American Foresters. The WVU forestry faculty is composed of a group of outstanding people representing all disciplines basic to forestry—and who have chosen teaching and research as their life's work and who are dedicated teachers.

The student body numbers over 650 and is one of the most congenial, yet spirited, groups on the campus. Forestry students are usually very active in social events, athletic competition, and service programs. This is true in spite of the fact that foresters' class schedules are more crowded than most. A typical day in the life of a forestry student might include breakfast in the dorm with your roommate, three or four morning classes, back to the dorm for lunch, change into field clothes for a trip to the University Forest, a hurried dinner so that a couple of hours are available for studying before the basketball game (or some other function), and one last crack at the books before bedtime.

The WVU forestry student is provided with the best of facilities. The Forestry Building, completed in 1965 at a cost of $2.5 million, contains specially designed classrooms, laboratories, faculty and graduate student offices, a read-

ing room, a student lounge, and student locker rooms. The reading room has been developed primarily for the use of the undergraduate student; it contains more than 20,000 cataloged books and bulletins.

The WVU Forest is a 7,500-acre tract only ten miles from the campus. It is used for teaching, research, and demonstration purposes, and is the site of various student activities, such as field days, where students compete in old-time woodsmen's activities.

Through its seven curriculum options (Forest Resources Management, Wildlife and Fishery Management, Wood Industries, Wood Science, Forest Science, Recreation Resources Management, and Recreation), the Division of Forestry prepares young men and women for a wide and interesting array of challenging careers.

Forest Resources Management

With the growing demand for forest products and the increasing public consciousness of the value of forests for recreation and watershed protection, career opportunities for professionals trained in the scientific management of timber resources are expanding rapidly. Graduates who major in Forest Resources Management have a wide range of prospective employers, including federal and state agencies and private industry.

Wildlife and Fishery Management

So you like to hunt and fish! Most young people do, but perhaps you are one who would like to know more about game and fish—how these creatures live, what they eat, and how their numbers may be increased. If so, you might consider a career in Wildlife and Fishery Management.

Wood Industries

Challenge and fulfillment permit no dull moments for well-trained administrative and scientific personnel in the wood products field. Graduates with training in wood products are sought by manufacturers of lumber, veneer, plywood, pulp, and paper, and particle board; and by companies using these materials for further manufacture of such things as flooring, furniture, millwork, boats, containers, and textiles. Other opportunities are with large wood-using industries (railroads, public utilities, and construction firms). If you are interested in sales work, forest industries have a special need for you. They demand people who can sell new wood products which are constantly being developed. Industries place no limitation on income, and they offer opportunity for rapid advancement, enjoyable work, and freedom of choice of location.

Recreation Resources Management

Population growth, together with a higher standard of living which allows for more leisure time, has resulted in greatly increased demand for outdoor recreation. In order to help meet this demand, resource managers are needed who are familiar with recreation problems and who have a good understanding of the natural sciences. The principal employing agencies are the Bureau of Outdoor Recreation, National Park Service, U. S. Forest Service, state and local recreation departments, and private recreation enterprises.

Wood Science

The curriculum in wood science option is intended to prepare students for graduate work in the more highly technical phases of wood use. The option is especially suitable for students who anticipate careers in research or teaching.

Recreation

The curriculum in recreation is designed to prepare students for professional recreation responsibilities in parks and recreation systems, governmental agencies, private industry, schools, churches, public housing, hospitals, and similar agencies serving a society which has become increasingly aware of appropriate use of leisure time.

As our society continues to use its scientific knowledge in efficient development of its natural and man-made resources, it will continue to make leisure time and recreation important social concerns. Are you interested in working with people? Do you feel that man, natural resources, and urban culture are closely related? Is it your wish to serve modern society through a career dovoted to the leisure aspect of people's lives? If so, consider the challenge of a relatively new field of service which has a variety of job opportunities and directions.

Summer Field Studies

The six-week Forest Resources Management Summer Field Practice consists of two consecutive three-week sessions, and is designed for students who have completed the junior year of the Forest Resources Management curriculum. Students live in Morgantown in University or privately owned housing, and travel to the nearby University Forest daily for field studies. The instructional program provides training in forest surveying, timber estimating, photo interpretation, forest management, and forest recreation. Occasional trips are made to wood-using industries and to other forests to study the management of northern hardwood and spruce types. The Summer Field Practice culminates in a one-week trip to North Carolina where silvicultural and management activities are observed in the Southern Pine Region.

The instructional program in the five-week Wood Industry Field Practice consists of a three-week field course in surveying and mensuration followed by a two-week trip to Virginia and North Carolina to observe various commercial wood-using industries. These industries include: lumber, plywood, veneer, particle board, furniture, glue lamination, and preservation. The two-week trip, which is Wood Science 100, is offered in the summer of odd years.

The Wildlife Summer Field Trip is a one-week field trip for students who have completed the junior year of the wildlife and fish management curriculum. The field trip is designed to acquaint students with major wildlife habitats outside of the Central Appalachians and with selected major wildlife refuges, shooting preserves, and other intensively managed areas. A summer of approved work experience in the wildlife field may be substituted for the requirements.

The Approved Summer Park Experience and Report is required of students who have completed the sophomore year of the Recreation Resources Management curriculum. Eight weeks of full-time, supervised professional field work is required of students who have completed the junior year of the Recreation curriculum. These summer experiences acquaint the students with the management of park and recreation enterprises.

For resident students the tuition is $9.00 per credit hour; for nonresidents the tuition is $41.25 per credit hour. A $30.00 laboratory fee is charged to all students. These must be paid to the University Comptroller at the time of registration. Other expenses include lodging and meals for those courses in which travel is involved.

Transfer Credits for Professional Courses

Students transferring to the Division of Forestry from one- or two-year technical schools or from four-year unaccredited forestry schools must take an advanced standing examination to demonstrate proficiency for any professional course offered by the Division of Forestry for which transfer credit is sought. This rule also applies to courses in dendrology and surveying. Advanced standing examinations are given after the student is enrolled in the Division of Forestry. All other credits are accepted subject to the regulations of the Office of Admissions and Records regarding transfer of credits.

SCHEDULE OF REQUIRED CURRICULUM FOR B.S.F. DEGREE IN FOREST RESOURCES MANAGEMENT (138 Hours)

NOTE: Credit for Math. 2 will not be counted towards the B.S.F. degree.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	Biol. 2	4	Biol. 51	2	Biol. 52	1
Chem. 15	4	Chem. 16	4	Econ. 51	3	F.M. 12	3
English 1	3	English 2	3	Agron. 10	3	Econ. 52	3
Math. 3	3	Math. 4	3	Math. 15	4	Core electives	9
For. 1	1	For. 4	0	Core electives	6		
Phys. Ed. 1	1	Phys. Ed. 2	1				
For. 3	0						
	16		15		18		16

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
C.E. 5	4	C.E. 6	2	F.M. 233	4	F.M. 232	2
W.S. 121	3	W.S. 130	3	Plant Path. 153	3	For. 220	3
F.M. 151	2	F.M. 122	3	W.M. 131	3	For. 226	2
F.M. 211	4	F.M. 230	3	Electives	7	Electives	9
Physics 1	4	Elect. (Oral or Written Communication)	3				
		Biol. 169	3				
	17		17		17		16

Summer Field Practice

F.M. 100—For. Surv. & Mensur. Field Practices	3
F.M. 101—For. Mgt., Util., & Wildlife Practices	3
	6

SCHEDULE OF REQUIRED CURRICULUM FOR B.S.F. DEGREE IN WOOD INDUSTRIES
(138 Hours)

NOTE: Credit for Math. 2 will not be counted toward the B.S.F. degree.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	Chem. 12	4	Biol. 51	2	Biol. 52	1
Chem. 11	4	English 2	3	Econ. 51	3	Econ. 52	3
English 1	3	Math. 4	3	W.S. 123	3	F.M. 12	3
Math. 3	3	For. 4	0	C.E. 1	2	F.M. 122	3
For. 1	1	Phys. Ed. 2	1	Math. 15	4	Core electives	6
Phys. Ed. 1	1	Core electives	6	Core electives	3		
For. 3	0						
	16		17		17		16

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Physics 1	4	W.S. 132	3	F.M. 233	4	For. 220	3
W.S. 141	3	W.S. 134	2	W.S. 232	3	W.S. 234	3
F.M. 211	4	For. 233	3	Electives*	9	W.S. 251	3
Core electives	3	W.S. 240	3			Electives*	8
Elective*	3	Electives	6				
	17		17		16		17

Summer Field Practice

F.M. 100—For. Surv. & Mens. Field Practice	3
W.S. 100—Wood Industries Field Trip**	2
	5

*The selection of electives indicated by (*) will depend on whether wood industry production or wood industry management is emphasized. Courses will be elected subject to the approval of the student's adviser.

**W.S. 100 is offered only in odd-numbered years. Students completing the sophomore year in an odd-numbered year will take Summer Field Practice at that time rather than after the junior year.

SCHEDULE OF REQUIRED CURRICULUM FOR B.S. DEGREE IN WILDLIFE AND FISHERIES MANAGEMENT (136 Hours)

NOTE: Credit for Math. 2 will not be counted towards the B.S. degree.

First Year (all three options)

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	Biol. 2	4
Chem. 15	4	Chem. 16	4
English 1	3	English 2	3
Math. 3	3	Math. 4	3
For. 1	1	For. 4	0
For. 3	0	Phys. Ed. 2	1
Phys. Ed. 1	1		
	16		15

During the final three years, the student has the option of emphasizing either: (1) Wildlife Science, (2) Wildlife Management, or (3) Fisheries.

Wildlife Science Option

Second Year				Third Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Biol. 51	2	Biol. 52	1	F.M. 211	4	W.M. 244	3
Math. 15	4	Math. 16	4	Physics 1	4	Physics 2	4
Econ. 51	3	F.M. 12	3	Core elective	3	Genetics 171	4
Sp. Com. 11	3	Chem. 131	4	Electives*	6	Core elective	3
Core electives	6	Core elective	3			Elective*	3
		Elective*	3				
	18		18		17		17

W.M. 100 . . . . . 1 hr. (Summer)

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
W.M. 213	4	W.M. 122	2
W.M. 231	3	W.M. 235	3
An. Physi. 100	3	Biol. 151	4
Core elective	3	Electives*	8
Elective*	4		
	17		17

*Courses will be selected subject to the approval of the student's adviser.

Wildlife Management Option

Second Year				Third Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Biol. 51	2	Biol. 52	1	F.M. 211	4	W.M. 224	3
Stat. 101	3	Chem. 131	4	Physics 1	4	Physics 2	4
Sp. Com. 11	3	Agron. 2	4	C.E. 1	2	Agr. Econ. 200 (3 hr.) or Agr. 254 (4 hr.)	3-4
Math. 15	4	Econ. 52	3	Core elective	3		
Econ. 51	3	Core electives	6	Elective*	3	Core elective	3
Core elective	3					Electives*	4
	18		18		16		17-18

W.M. 100 ..... 1 hr. (Summer)

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
W.M. 213	4	W.M. 122	2
W.M. 231	3	W.M. 235	3
An. Phys. 100	3	Agr. Econ. 200 (3 hr.) or Agr. 254 (4 hr.)	3-4
Electives*	7	Electives*	9
	17		17-18

*Courses will be selected subject to the approval of the student's adviser.

Fisheries Option

Second Year				Third Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Biol. 51	2	Biol. 52	1	Bact. 141	4	Physics 2	4
Math. 15	4	F.M. 12	3	Physics 1	4	Biol. 151	4
Sp. Com. 11	3	Math. 16	4	W.M. 213	4	Biol. 345 or 257	3-4
Econ. 51	3	Chem. 131	4	Core elective	3	Core electives	6
Core electives	6	Core elective	3	Elective*	3		
		Elective*	3				
	18		18		18		17-18

W.M. 100 ..... 1 hr. (Summer)

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Biol. 246	4	Comp. Sci. 1	3
Biol. 255	4	Biol. 345 or 257	3-4
An. Phys. 100	3	Genetics 171	4
Stat. 101	3	Electives*	5
Elective*	3		
	17		15-16

*Courses will be selected subject to the approval of the student's adviser.

SCHEDULE OF REQUIRED CURRICULUM FOR B.S. DEGREE IN RECREATION RESOURCES MANAGEMENT (135 Hours)

NOTE: Credit for Math. 2 will not be counted towards the B.S. degree.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	Biol. 2	4	Biol. 51	2	Biol. 52	1
Geol. 1	3	Geol. 3	3	C.E. 5	4	C.E. 6	2
Geol. 2	1	Geol. 4	1	Econ. 51	3	Econ. 52	3
English 1	3	English 2	3	Sp. Com. 11	3	F.M. 12	3
Math. 3	3	Math. 4	3	Core Group A	6	Acctg. 51	3
For. 1	1	For. 4	0			Electives	6
For. 3	0	Phys. Ed. 2	1				
Phys. Ed. 1	1	Core Group A	3				
	16		18		18		18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
For. 140	3	R.P. 265	3	W.M. 131	3	R.P. 142	3
F.M. 151	2	R.P. 316	3	R.P. 233	3	For. 220	3
F.M. 211	4	F.M. 232	2	R.P. 335	3	For. 226	2
Sociol. 1	3	Journ. 111	3	L.A. 276	3	Elective	6
Electives	4	Ag. Econ. 200	3	Communication elective	3		
				Elective	3		
	16		14		18		14

(To be taken after Third Year)

R.P. 100 1

SCHEDULE OF REQUIRED CURRICULUM FOR B.S. DEGREE IN FOREST SCIENCE (136 Hours)

NOTE: Credit for Math. 2, 3, and 4 will not be counted toward the B.S. degree.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	Biol. 2	4	Biol. 51	2	Biol. 52	1
English 1	3	English 2	3	C.E. 1	2	Biol. 169	3
Math. 15	4	Math. 16	4	Econ. 51	3	Physics 11	4
Chem. 15	4	Chem. 16	4	Agron. 10	3	F.M. 12	3
For. 1	1	For. 4	0	Electives°	6	Electives°	6
For. 3	0	Phys. Ed. 2	1				
Phys. Ed. 1	1						
	17		16		16		17

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
F.M. 211	4	F.M. 122	3	W.S. 123	3	Stat. 312	3
Chem. 133	3	F.M. 230	3	W.M. 131	3	Electives*	15
Chem. 135	1	Electives*	12	Statistics 311	3		
Physics 12	4			Electives*	9		
Electives*	4						
	16		18		18		18

*All elective hours are to be determined in consultation with faculty adviser.

SCHEDULE OF REQUIRED CURRICULUM FOR B.S. DEGREE IN WOOD SCIENCE
(130 Hours)

NOTE: Credit for Math. 2, 3, and 4 will not be counted toward the B.S.W.S. degree.

Twenty-one elective hours must be selected so as to meet University Core Curriculum requirements, and 18 elective hours must be selected with the adviser's approval.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	Chem. 15	4	Biol. 51	2	Biol. 52	1
English 1	3	English 2	3	W.S. 123	3	Biol. 169	3
Math. 15	4	Math. 16	4	Physics 11	4	Physics 102	4
For. 1	1	Phys. Ed. 2	1	Chem. 16	4	T.A.M. 101	3
Phys. Ed. 1	1	Elective	3	Math. 17	4	Elective	3
Elective	3	For. 4	0				
For. 3	0						
	16		15		17		14

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
W.S. 261	3	F.M. 12	3	W.S. 232	3	W.S. 240	3
Chem. 133	3	F.M. 230	3	Electives	15	W.S. 251	3
Chem. 135	1	W.S. 134	2			Electives	11
T.A.M. 102	3	Electives	9				
Econ. 51	3						
Elective	3						
	16		17		18		17

Approved Summer Work Experience
(To be taken after Third Year)

SCHEDULE OF REQUIRED CURRICULUM FOR B.S. DEGREE IN RECREATION
(130 Hours)

NOTE: Credit for Math. 2 will not be counted towards the B.S.R. degree.

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	Biol. 2	4
English 1	3	English 2	3
R.P. 1	3	R.P. 40	3
Health Ed. 2	2	Hist. elect. (W)	3
Dance 5 (W)	1	Music 30 (W)	3
Phys. Ed. 33 or 14 (W)	1	Psych. 1 (M)	3
Phys. Ed. 35 (W)	1	Dance 5 (M)	1
Phys. Ed. 50 or 52 (M)	1		
Phys. Ed. 53 (M)	2		
	W-15		W-16
	M-15		M-14

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 8	3	Sp. Com. 11	3
Geol. 2	1	Sociol. 1	3
Geol. 5	3	R.P. 263	3
R.P. 41	3	Math. 21 (W)	2
Phys. Ed. 54 (W)	2	Psych. 1 (W)	3
Art 30 (W)	3	Phys. Ed. 66 (W)	1
Music 30 (M)	3	Dance 132 (M)	1
Elective	2	Phys. Ed. 54 (M)	2
		Math. 3 (M)	3
	W-17		W-15
	M-15		M-15

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Core A Elect.	3	Pol. Sci. 120	3
R.P. 251	3	For. 140	3
Phys. Ed. 130	1	R.P. 265	3
Econ. 51 (W)	3	Lit. elect. (W)	3
Safety Ed. 70	2	Dance 132 (W)	1
Safety Ed. 131 (W)	2	Elective (W)	3
Elective (W)	3	Econ. 51 (M)	3
Art 30 (M)	3	Drama 100 (M)	3
Lit. elect. (M)	3	Drama 101 (M)	1
Hist. elect. (M)	3	Safety Ed. 131 (M)	2
	W-17		W-16
	M-18		M-18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
R.P. 202	3	R.P. 236	3
R.P. 233 (M)	3	R.P. 316	3
R.P. 335	3	Journ. 111	3
Sociol. (200 level)	3	Psych. 101	3
Elective (W)	3	Electives	6
Drama 100 (W)	3		
Drama 101 (W)	1		
Electives (M)	5		
	W-16		W-18
	M-17		M-18

During the Summer between the junior and senior years and when upper-level recreation courses are completed, all majors are required to do at least eight weeks of supervised recreation leadership field work. The selected agency in which the student will do his work must be approved by the student's adviser. Arrangements will be made for supervision and visitation. The final report and evaluation by the student must be completed by the end of the succeeding semester.

Courses of Instruction

Forestry

For.

1. **Professional Orientation.** I. 1 hr. (Required only for students who rank as freshmen in the Division of Forestry.) Survey of degree options in the Division of Forestry and related career and professional opportunities.

3, 4. **Forestry Convocation.** I and II. No credit. All students are expected to attend the weekly convocation. Attendance is required of students during their first two semesters in the Division of Forestry. Speakers and timely topics in forestry and allied fields are presented.

140. **West Virginia's Natural Resources.** I, II, S. 3 hr. Survey of policies and practices in development and use of soil, water, forest, wildlife, mineral and human resources in West Virginia.

175. **Independent Study.** I, II, S. 1-4 hr. (4 hr. max.). Self-directed analysis of some aspect of natural resource use, recreation, ecology, or environmental pollution. Emphasis is on self-learning, including selection and delineation of a topic, self-disciplined study, and a creative approach to communicating what has been learned.

219. **Forest Hydrology.** II. 3 hr. PR: Consent. Description and quantitative treatment of the hydrologic cycle, with primary emphasis on the role of forests and topography.

220. **Forest Policy and Administration.** II. 3 hr. (Upperclassmen only.) Forest policy in the United States; important federal and state laws; administration of public and private forests; problems in multiple-use forestry.

226. **Remote Sensing of Environment.** II. 2 hr. PR: Math. 3, 4. Principles of measurement and interpretation of natural resources and environment from photography, radar, infrared, and microwave imagery.

233. **Principles of Industrial Forestry.** II. 3 hr. PR: Senior standing or consent. Analysis and case studies of problems pertinent to the integration of wood conversion technology with principles of production, marketing, and management.

319. **Microclimatology.** II. 3 hr. PR: Consent. A description and quantitative treatment of climate near the ground in terms of physical and physiological processes of energy and mass exchange.

Forest Management

F.M.

12. **Forest Ecology.** II. 3 hr. PR: Biol. 51. Forest and environment factors; site and type characteristics.

100. **Forest Surveying and Mensuration Field Practices.** S. 3 hr. PR: Biol. 51, C.E. 5, F.M. 122. The application of surveying and mensurational practice with emphasis on field problems. ($30.00 lab fee.)

101. **Forest Management, Utilization, and Wildlife Practices.** S. 3 hr. PR: F.M. 100. Study of forest management utilization and wildlife problems. Trip to observe forest management and utilization in the Southern Pine Region. ($30.00 lab fee.)

122. **Forest Mensuration.** II. 3 hr. PR: Math. 3, 4. Introduction to statistics and basic sampling concepts. Measurement of forest products, trees, stands growth, and yield.

132. **Farm Woods Management.** II. 3 hr. Students majoring in forest resource management and wood industry may not take this course for credit. Characteristics of forest trees; management of farm woods for timber, wildlife, watershed protection, and recreation; measuring and marketing farm timber; plantation establishment.

151. **Forest Fire Protection.** I. 2 hr. PR: Upperclassmen only. Factors affecting forest fire behavior; preventive action, preparation activities and control of forest fires; use of fire in forest land management.

170. **Forestry Problems.** I, II. 1-4 hr. For seniors only. (4 hr. max.).

211. **Silvicultural Systems.** I. 4 hr. PR: F.M. 12. Principles of regeneration cuttings, intermediate cuttings, and cultural operations, with their application to forest stands.

213. **Regional Silviculture.** I. 2 hr. PR: F.M. 12; PR or Conc.: F.M. 211. Major forest types of the United States; their composition, management, problems and silvicultural treatment.

215. **Principles of Artificial Forestation.** II. 3 hr. PR: F.M. 12. Seeding and planting nursery practice; phases of artificial regeneration.

216. **Forest Genetics and Tree Improvement.** II. 3 hr. PR: Genet. 272 or equiv., or consent. A study of forest genetic principles and their application to forest tree improvement including crossing methods, selection systems, and other tree improvement techniques.

222. **Forest Mensuration.** II. 3 hr. PR: F.M. 122. The measurement of growth and yield; statistical methods applied to forest measurement problems.

230. **Principles of Forestry Economics.** II. 3 hr. PR: Econ. 51 and 52 or equiv. The economics of production, distribution, and use of forest goods and services. Emphasis is on analytical methods and techniques in dealing with forest economic problems.

232. **Forest Finance.** II. 2 hr. PR: Junior standing. Interest, discount, and rate earned, in forest production and exploitation. Particular reference to the problems of forestry such as determining the value of standing timber, the appraisal of forest damages, and forest taxation.

233. **Forest Management.** I. 4 hr. PR: Summer Camp; PR or Conc.: F.M. 211. The principles of sustained yield forest management. Organization of the forest area, selection of management objectives, application of silvicultural systems, and regulation of the cut. The forest management plan.

234. **Forest Management Plans.** II. 2 hr. PR: F.M. 233. Analyses of forest management plans. Construction of a sustained yield timber management plan for a specific forest tract.

330. **Advanced Principles of Forestry Economics.** II. 3 hr. PR: Econ. 51 and 52 or equiv., F.M. 230 or equiv. Intensive study of both micro- and macroeconomics of forestry.

Wood Science

W.S.

100. **Wood Industries Field Trip.** S. 2 hr. PR: W.S. 134. A trip of two-weeks' duration to observe manufacturing methods and techniques of commercial wood industry plants including furniture, plywood, veneer, hardboard, particle board, pulp and paper, sawmilling, and preservation. (Offered in odd years.) ($30.00 lab fee.)

121. **Wood Technology.** I. 3 hr. PR: Biol. 51. For students other than those taking the Wood Industries and Wood Science options, designed to provide familiarity with the technical aspects of wood utilization.

123. **Wood Identification.** I. 3 hr. PR: Biol. 51. Identification of commercial timbers of U.S.; basic properties and uses of different woods.

130. **Wood Processes and Products.** II. 3 hr. PR: F.M. 122. The conversion of standing timber into primary and secondary products.

132. **Primary Conversion and Grading.** II. 3 hr. PR: W.S. 123 or consent. Principles of the conversion of raw material in log form to primary wood products. Elements of the grading of raw materials and primary products. Production planning and control. Primarily for wood industry and wood science.

134. **Secondary Manufacturing Process.** II. 2 hr. PR: W.S. 123 or consent. Detailed study of the materials and processes involved in the manufacturing of secondary wood products. Primarily for wood industry and wood science majors.

141. **Properties of Wood.** I. 3 hr. PR: W.S. 123. Physical and mechanical properties of wood.

170. **Problems in Wood Science.** I, II. 1-4 hr. (4 hr. max.). For seniors only.

231. **Wood Finishing.** I. 3 hr. PR: W.S. 121 or consent. A technical course in wood finishing covering surface preparation, composition of finishing materials, equipment, techniques, defects, troubleshooting, and quality control.

232. **Theory and Practice of Wood Adhesion.** I. 3 hr. PR: W.S. 123, 141 or consent. Detailed theoretical introduction and examination of different types of adhesives and gluing techniques used in the wood industry.

234. **Statistical Quality Control.** II. 3 hr. PR: W.S. 134 or consent. A study of methods used to control quality of manufactured wood products. Control charts of variables and attributes. Acceptance sampling techniques. (Offered in even years.)

240. **Wood Moisture Relationships.** II. 3 hr. PR: W.S. 123. A study of the principles involved in the relation between wood and moisture, and purposes, effects and methods of seasoning.

251. **Forest Products Protection.** I. 3 hr. PR: W.S. 123, 134 or consent. A study of the biological organisms responsible for the deterioration of wood products, their control by preservative methods, and a study of fire retarding methods.

320. **Wood Microstructure.** I. 3 hr. PR: W.S. 123; senior standing, or consent. A detailed examination of wood microstructure as it relates to processing, behavior, and identification.

Wildlife Management

W.M.

100. **Wildlife Summer Field Trip.** S. 1 hr. PR: W.M. 131 or consent. A two-week-long field trip designed to acquaint wildlife students with major wildlife habitats outside of the Central Appalachians and with selected major wildlife refuges, shooting preserves, and other intensively managed areas. Approved summer work experience in the wildlife field may be substituted for this course.

122. **Ornithology.** II. 2 hr. PR: Biol. 1, 2, or consent. Identification, distribution, and ecology of birds (particularly of forest lands).

131. **Wildlife Management.** I. 3 hr. PR: Biol. 2. Basic principles of handling wildlife as a forest crop, including population of dynamics, ecological relationships, social behavior, habitat manipulation, and game administration.

170. **Problems in Wildlife Management.** I, II. 1-4 hr. (4 hr. max.). For seniors only.

213. **Wildlife Ecology.** I. 4 hr. PR: Biol. 1 and 2. Basic principles of ecology and their application to wildlife. Field and laboratory studies of major ecosystems important to wildlife, including management of these ecosystems for wildlife.

224. **Forest Zoology.** II. 3 hr. PR: Biol. 2. The relationship of mammals, birds, reptiles, amphibians, and fish to the forest, with emphasis on ecology and taxonomy of these groups. Laboratory will emphasize wildlife anatomy.

231. **Wildlife Techniques.** I. 3 hr. PR: W.M. 131, 213, Biol. 151, or consent. Field and laboratory techniques necessary in the management and study of wildlife; collection of field data, mapping, censusing, habitat evaluation, literature and scientific writing are stressed.

234. **Principles of Wildlife Management.** II. 3 hr. PR: W.M. 213 or consent. A survey of the major game animals and the problems and principles involved in their management.

312. **Wildlife Population Ecology.** II. 3 hr. PR: W.M. 131, Stat. 211, or equiv. Theory of population growth, population change, intraspecific and interspecific relationships that are involved in the natural regulation of populations, and the effects of exploitation on wildlife populations.

370. **Wildlife Seminar.** II. 1 hr. per sem.; (4 hr. max.). PR: Consent. Discussion of current developments in wildlife management.

Recreation and Parks

R & P

1. **Introduction to Recreation.** I. 3 hr. A framework into which the other recreation courses with all their implications will fit. Recreation history, trends, concepts, relationship to other fields; surveys of national organizations, leaders, and literature.

13. **Recreation and the School.** I. 3 hr. Open to students with at least sophomore status in physical education. Study of basic concepts of play, recreation, leisure, and their relationship to physical education.

40. **Nature Recreation and Camping.** II. 3 hr. PR: Recreation majors or consent. Lecture and workshop. Introduction to organized camping movement including purposes, camp sites, equipment, programs and leadership. Exploration of nature recreation and its relationship to community recreation and camping programs.

41. **Social Recreation.** I. 3 hr. Lecture and workshop course. Place of social recreation activities, informal dramatic and music in community center, playground, camp and school extracurricular programs.

100. **Approved Summer Park Experience and Report.** S. 1 hr. PR: Junior standing. One summer's experience in the management of the park or related recreational enterprise followed by a written report.

142. **Fundamentals of Nature Interpretation.** II. 3 hr. PR: Senior standing or consent. Methods and techniques of interpreting the natural environment to individuals and groups.

170. **Problems in Recreation and Parks.** I, II. 1-4 hr. (4 hr. max.). For seniors only.

202. **Field Work.** I, II. 3 hr. Recreation majors are required to have at least 8 weeks of supervised recreation leadership field work, usually during summer following junior year and after completion of upper-level recreation courses. Arrangements under the direction of chairman.

233. **Park Management.** I. 3 hr. PR: Junior standing. Introduction to administration and management problems associated with provision of recreation in parks under both private and public control.

251. **Recreation Leadership.** I. 3 hr. Meaning of leadership, its application to the field of recreation, and analysis of techniques. Examination of social group work method and its application particularly in national youth organizations.

263. **Program Planning.** II. 3 hr. PR: R & P 1. Fundamentals for general program planning; considering needs, facilities, age groups, local customs, climatic factors, etc. Planning involved in playgrounds, indoor centers, playfields, parks, hospitals, voluntary agencies, industry, and camps.

265. **Functional Planning of Recreation and Park Facilities.** II. 3 hr. Lecture and workshop. Problems and principles governing the planning for functional and effective usage of facilities in recreation. Emphasis on playgrounds, playfields, indoor centers, parks, camps, and swimming pools.

271. **Administration of Camping Services.** II. 3 hr. PR: R & P 40 or equiv. or consent. Principles involved in modern camping programs, organization and administration of camps.

316. **Philosophy of Recreation.** II. 3 hr. PR: Consent. Interpretation of recreation as a basic part of the living process; importance to individual community and national welfare; social and economic significance.

324. **Outdoor Recreation in Our Modern Society.** II. 3 hr. PR: For persons in fields of recreation, park, outdoor education and conservation, or consent. Interpretation as to what it is, what people do, where they go, how this affects our economics, social, and cultural life, and significant trends.

335. **Administration of Recreation.** I. 3 hr. PR: Major in recreation, or consent. General principles of administration; organization of staff administrative procedures. Study of enabling laws, legal responsibilities, surveys, finance, programs, facilities, and public relations.

348. **Outdoor Education and School Camping.** 3 hr. PR: For majors in education, recreation, extension, forestry, or consent. Course designed to meet the needs of schools, colleges, and other education and conservation agencies interested in developing outdoor education programs. Emphasis is upon interpretation and and programming of the outdoor education concept.

Division of Plant Sciences

Faculty

Mannon E. Gallegly, Jr., Ph.D. (U. Wisc.), *Director of Division of Plant Sciences; Professor of Plant Pathology and Plant Pathologist.*

R. E. Adams, Ph.D. (Cornell U.), *Professor of Plant Pathology and Plant Pathologist.*

John J. Albert, Ph.D. (VPI), *Assistant Professor of Plant Pathology and State Extension Specialist—Plant Pathology, University Experiment Farm, Kearneysville.*

Freddie L. Alt, B.S.Agr. (WVU), *Instructor in Agronomy and Farm Superintendent.*

Barton S. Baker, Ph.D. (WVU), *Assistant Professor of Agronomy and Assistant Agronomist, Allegheny Highlands Project, Elkins.*

John A. Balasko, Ph.D. (U. Wisc.), *Assistant Professor of Agronomy and Assistant Agronomist.*

John F. Baniecki, Ph.D. (U. Ariz.), *Assistant Professor of Plant Pathology and State Extension Specialist—Plant Pathology and Entomology.*

H. L. Barnett, Ph.D. (Mich. St. U.), *Professor of Mycology and Mycologist.*

Joseph G. Barrat, Ph.D. (U. New Hamp.), *Professor of Plant Pathology and Superintendent, University Experiment Farm, Kearneysville.*

Newton M. Baughman, Ph.D. (Purdue U.), *Professor of Agronomy and Agronomist; Director, International Programs.*

Bradford C. Bearce, Ph.D. (U. Calif.), *Associate Professor of Horticulture and Associate Horticulturist.*

Larry G. Bennett, Ph.D. (WVU), *Research Assistant, Agronomy.*

Orus L. Bennett, Ph.D. (WVU), *Assistant Professor of Agronomy and Research Soil Scientist, U.S.D.A.*

Steven Blizzard, M.S. (WVU), *Instructor in Horticulture and Farm Superintendent.*

James L. Brooks, Ph.D. (U. Calif.), *Associate Professor of Agricultural Biochemistry and Associate Agricultural Biochemist.*

Linda Butler, Ph.D. (U. Ga.), *Associate Professor of Entomology and Associate Entomologist.*

William H. Childs, Ph.D. (Cornell U.), *Professor Emeritus of Horticulture.*

Edward S. Elliott, Ph.D. (WVU), *Professor of Plant Pathology and Plant Pathologist.*

Edwin Gould, B.S. (WVU), *Associate Professor Emeritus of Entomology, University Experiment Farm, Kearneysville.*

Walter E. Grube, M.S. (Penn. St. U.), *Research Assistant, Agronomy.*

N. Carl Hardin, Jr., M.S. (WVU), *Professor of Horticulture and State Extension Specialist—Horticulture.*

Clinton E. Hickman, M.S. (WVU), *Assistant Professor of Horticulture and Assistant Horticulturist and Superintendent, Ohio Valley Farm, Point Pleasant.*

L. Morris Ingle, Ph.D. (Purdue U.), *Professor of Horticulture and Horticulturist.*

Everett M. Jencks, Ph.D. (Rutgers U.), *Associate Professor of Agronomy and Associate Agronomist.*

Walter J. Kaczmarczyk, Ph.D. (Hahnemann Med. C.), *Associate Professor of Genetics and Associate Geneticist.*

Robert F. Keefer, Ph.D. (Ohio St. U.), *Associate Professor of Agronomy and Associate Agronomist.*
Virgil G. Lilly, Ph.D. (WVU), *Professor Emeritus of Physiology.*
William L. MacDonald, Ph.D. (Iowa St. U.), *Assistant Professor of Plant Pathology and Assistant Plant Pathologist.*
Ray S. Marsh, A.M. (U. Mo.), *Professor Emeritus of Horticulture.*
Wayne N. Millar, Ph.D. (Penn. St. U.), *Associate Professor of Bacteriology and Associate Bacteriologist.*
Paul G. Moe, Ph.D. (Rutgers U.), *Professor of Bacteriology and Bacteriologist.*
Joginder Nath, Ph.D. (U. Wisc.), *Professor of Genetics and Geneticist.*
Oliver M. Neal, Jr., Ph.D. (Mich. St. U.), *Professor of Horticulture and Horticulturist.*
G. Gordon Pohlman, Ph.D. (Iowa St. C.), *Professor Emeritus of Agronomy.*
David O. Quinn, M.S. (WVU), *Associate Professor of Plant Pathology and State Program Leader—Safe Use of Pesticides.*
Oscar E. Schubert, Ph.D. (U. Ill.), *Professor of Horticulture and Horticulturist.*
Eion G. Scott, Ph.D. (U. Calif.), *Professor of Horticulture and Horticulturist.*
George Sharpe, M.S. (WVU), *Associate Professor Emeritus of Agronomy.*
Rabindar N. Singh, Ph.D. (VPI), *Assistant Professor of Agronomy and Assistant Agronomist.*
Richard M. Smith, Ph.D. (Ohio St. U.), *Professor of Agronomy and Agronomist.*
Charles B. Sperow, Jr., M.S. (WVU), *Associate Professor of Agronomy and State Extension Specialist—Crops Agronomy.*
David A. Stelzig, Ph.D. (N.D. St. U.), *Associate Professor of Agricultural Biochemistry and Associate Agricultural Biochemist.*
LeRoy P. Stevens, M.S. (WVU), *Assistant Professor of Horticulture, Assistant Horticulturist and Superintendent, Reedsville Experiment Farm.*
R. Philip True, Ph.D. (U. Penn.), *Professor Emeritus of Plant Pathology.*
Valentin Ulrich, Ph.D. (Rutgers U.), *Professor of Genetics and Geneticist.*
Vincent J. Valli, M.S. (Ohio Christian C.), *Assistant Professor of Agricultural Meteorology and Assistant Agricultural Meteorolgist.*
Willem A. van Eck, Ph.D. (Mich. St. U.), *Professor of Soil Science and State Extension Specialist—Soil Science.*
Collins Veatch, Ph.D. (U. Ill.), *Professor Emeritus of Agronomy.*
Joseph E. Weaver, M.S. (WVU), *Research Assistant, Entomology.*
Harold A. Wilson, Ph.D. (Iowa St. C.), *Professor Emeritus of Bacteriology.*
Zeke C. Wood, M.S. (WVU), *Area Extension Specialist, Horticulture.*
Richard T. Wurster, Ph.D. (Cornell U.), *Associate Professor of Horticulture (Makerere University, Kampala, Uganda).*
Robert J. Young, Ph.D. (Ore. St. U.), *Assistant Professor of Plant Pathology and Assistant Plant Pathologist.*
Roger S. Young, Ph.D. (Mich. St. U.), *Assistant Professor of Horticulture and Assistant Horticulturist, University Experiment Farm, Kearneysville.*
Richard K. Zimmerman, M.S. (WVU), *Assistant Professor of Plant Sciences and State Extension Specialist, Plant Sciences and Conservation.*

Bachelor of Science

The curriculum in science, with its flexible design, will provide the student with the opportunity to acquire the necessary background in biochemistry, mathematics, chemistry, physics, and modern concepts of biology in preparation for professional or graduate study. Selection of individual courses is the responsibility of the student in consultation with his adviser. The student must complete a minimum of two courses each in biology, chemistry, and physics and must complete mathematics through calculus. Students may substitute chemistry for calculus to meet degree requirements.

Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences° (Group C included) (A minimum of two courses in each of biology, chemistry, physics and mathematics through calculus is required.)	40
Courses in the College of Agriculture and Forestry	24
Physical Education	2
Free Electives°°	32
Total	128

°Students may substitute advanced chemistry courses for calculus to meet degree requirements. This ordinarily means a minimum of 12 hours of chemistry in addition to the required courses. The 40 hours of natural sciences are exclusive of the courses offered in the College of Agriculture and Forestry.

°°The student may elect to take courses in Military Science (ROTC) or Air Force Aerospace Studies (ROTC).

Bachelor of Science in Agriculture

Agronomy (Forage and Grain Crops, Soil Science, and Soil Conservation)

Students will specialize in crop science, soil science, or both, depending upon their interest in preparing themselves for positions involving various phases of crop production and use, soil conservation, land management and classification, fertilizer use, weed control, farm management, and turf and golf course maintenance. They may be employed by governmental agencies and private industry or be self-employed.

Horticulture (Ornamentals, Fruits, Vegetables, and Soils)

Students will study plant breeding, plant physiology, plant pathology, fertilization, and soils. Students may prepare for careers in commercial crop production, seed production, farm management, or careers with chemical firms, the fertilizer industry, or the nursery business. Positions as park and golf course superintendents are available to graduates of this program and many will take positions with state and federal agencies.

Curriculum Requirements

For all students in the curriculum in Agriculture the program of courses taken in the freshman year is essentially the same. However, students are urged to select the appropriate adviser so that they may develop their program of study in one of the areas described above while meeting the requirements for the curriculum which are as follows:

Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C included) (Must elect a minimum of 8 credits in biology; 8 credits in chemistry; 3 credits in college algebra or equivalent)	24
Courses in Agriculture	45
Elect a minimum of 3 credits in each of the following: 1. Animal Science 2. Plant Science 3. Soil Science 4. Agricultural Economics	
Elect additional courses to obtain a total of 45 credits in Agriculture.	
Physical Education	2
Free Electives*	35
Total	136

*Student may elect to take courses in Military Science (ROTC) or Air Force Aerospace Studies (ROTC).

Courses of Instruction

Assigned Topics

In order to be eligible to register in Assigned Topics 180, the student must: (1) be in good standing, and (2) obtain approval of the appropriate Division Director prior to registration.

Plant Science

Plant Sci.

52. **Principles of Plant Science.** II. 4 hr. Basics of the nature, history, classification, role, distinction, structure and function, reproduction, improvement, culture, pests, storage and handling, production and marketing, and utilization of agricultural plants.

Agronomy

Agron.

2. **Principles of Soil Science.** II. 4 hr. PR: Inorganic Chem. An introduction to soil science. 3 lec., 1 lab.

10. **Forest Soils.** I. 3 hr. PR: Inorganic Chem. Principles of soil science with particular reference to forest soils. 2 lec., 1 lab.

115. **Soil Judging, Mapping and Interpretation.** I. 3 hr. PR: Agron. 2 or 10. Techniques in observing and describing soil profiles, mapping by modern systems and interpreting basic soil surveys for varied soil use.

180. **Assigned Topics.** I, II. 1-4 hr. per sem.

210. **Soil Fertility.** I. 3 hr. PR: Agron. 2 or 10. Soil properties in relation to fertility and productivity of soils; evaluation of soil fertility; production of fertilizers and their use in increasing the fertility and productivity of soils.

212. **Soil Conservation and Management.** II. 3 hr. PR: Agron. 2 or 10. Using soil technology to solve soil management problems relating to cropping systems. Field diagnosis of soil problems will be stressed. (Offered in odd years.)

230. **Soil Physics.** II. 3 hr. PR: Agron. 2 or 10. Physical properties of soils; water and air relationships and their influence on soil productivity. (Offered in even years.) 2 lec., 1 lab.

250. **Turfgrass Management.** I. 3 hr. PR: Agron. 2 or consent. The establishment, maintenance, and adaption of grasses and legumes for lawns, golf courses, parks, athletic fields, and roadsides. An understanding of turf-grass management will be developed by associating differential plant responses with soil, climatic, and biotic factors that influence plant species growth, selection, and adaptation. (Offered in even years.)

251. **Weed Control.** I. 3 hr. PR: Plant Sci. 52, Agron. 2, or consent. Fundamental principles of weed control. Recommended control measures for and identification of common weeds. (Offered in odd years.)

252. **Grain and Special Crops.** I. 3 hr. PR: Plant Sci. 52, Agron. 2, or consent. Advanced study of methods in the production of grain and special crops. Varieties, improvement, tillage, harvesting, storage, and uses of crops grown for seed or special purposes. (Offered in even years.)

254. **Pasture and Forage Crops.** II. 4 hr. PR: Plant Sci. 52 and Agron. 2, or consent. All phases of pasture and forage crop production, including identification, seeding, management, use, seed production, and storage of forage crops.

301. **Geotechnic.** I. 3 hr. PR: Consent. A presentation of a unified approach to the various aspects of soil formation and the influence of the formative factors on the nature of soils and their use as engineering materials. This course will serve as a common meeting ground for students in the various disciplines concerned with earth science. 3 lec. (Offered in odd years.)

315. **Soil Genesis and Classification.** I. 3 hr. PR: Agron. 2 or 10. Origin and formation of soils. Study of soil profiles and soil forming processes in the field and laboratory. Principles of classification and techniques of soil mapping. 2 lec., 1 lab. (Offered in even years.)

321. **Identification of Clay Minerals in Soils.** II. 3 hr. PR: Physical Chem. or consent. Characterization of clay minerals is becoming an important aspect of research and practical application in the areas of soil, geology, civil engineering, and related fields. The course will provide a vehicle for these various disciplines to study the methods used in qualitative and quantitative identification of these secondary minerals. 1 lec., 2 lab. (Offered in even years.)

Bacteriology

Bact.

141. **General Bacteriology.** I, II. 4 hr. PR: Inorganic Chem. Introductory morphological, cultural, and physiological characteristics of bacteria; application of bacteriology to agriculture, home economics, sanitation, and health.

180. **Assigned Topics.** I, II, S. 1-4 hr. per sem.

347. **Food Microbiology.** I. 4 hr. PR: Bact. 141, organic chemistry or consent. The ecology and physiology of microorganisms important in the manufacture and deterioration of foods, and the techniques for the microbiological examination of food. (Offered in even years.)

348. **Sanitary Bacteriology.** I. 3 hr. PR: Bact. 141. Standard bacteriological methods used in routine examination of water and sewage. (Offered in odd years.)

Entomology

Entom.

152. **Forest Entomology.** II. 3 hr. PR: F.M. 211. Relationships between insects and the forest; recognition and control of important species. This course is primarily designed for forestry students.

180. **Assigned Topics.** I, II, S. 1-4 hr. per sem.

204. **Principles of Entomology.** I. 4 hr. PR: Biol. 1 and 2 or equiv. A basic course dealing with the anatomy, morphology, physiology, reproduction, systematics, ecology, and control of insects.

Genetics

Gen.

171. **Principles of Genetics.** II. 4 hr. PR: 8 hr. of biological science. The fundamentals of inheritance.

180. **Assigned Topics.** I, II. 1-4 hr. per sem. PR: Gen. 171 or 321 and consent.

290. **Crop Breeding.** II. 3 hr. PR: Gen. 171 or 321. Methods and basic scientific principles involved in the improvement of leading cereal and forage crops through hybridization and selection. (Offered in odd years.)

321. **Basic Concepts of Modern Genetics.** I. 3 hr. PR: 8 hr. of biological science and 1 year of chemistry. Independent inheritance, linkage. Chemical nature of genetic material. Control of phenotype by genetic material. Gene action and coding of genetic material.

325. **Human Genetics.** I. 3 hr. PR: Gen. 171 and 321 or consent. A study of the genetic system responsible for the development of phenotype in man. (Offered in even years.)

335. **Population Genetics.** I. 3 hr. PR: Gen. 171 or 321, or consent. The relationship of gene and genotype frequencies in populations of diploid organisms, and the effects of mutation, migration, selection, assortive mating, and inbreeding, in relation to single gene pairs. Application of these concepts to the multigenic inheritance of quantitative traits. (Offered in even years.)

Horticulture

Hort.

107. **General Horticulture.** I. 3 hr. PR: Biol. 1, Plant Sci. 52 or consent. Principles underlying present day horticulture practice with special emphasis on how basic discoveries in plant science have been applied in horticulture.

115. **Judging and Identification of Apple Varieties.** I. 1 hr. Two laboratory periods half of semester. Identification and judging of apple varieties.

116. **Flower Judging.** II. 1 hr. One laboratory period per week. Identification and judging of flowers with emphasis on the aesthetic values which underlie desirability in a variety.

117. **Vegetable Identification and Judging.** I. 1 hr. Identification and judging the common vegetables and the test associated with olericulture in West Virginia. Emphasis is placed on the cultural practices associated with top quality vegetables.

151. **Floral Design.** I. 3 hr. A basic course in flower arrangement to cover occasions for the home and retail flower shop.

160. **Woody Plant Materials.** I. 3 hr. Identification, ecology, and evaluation of trees, shrubs, vines and groundcovers for landscape plantings.

162. **Plant Materials.** I. 3 hr. Identification, description, adaptability and evaluation of the principal kinds and varieties of annual and herbaceous perennials with emphasis on their use as design elements.

180. **Assigned Topics.** I, II, S. 1-4 hr. per sem.

204. **Plant Propagation.** II. 3 hr. A study of the practices of plant propagation and the factors involved in reproduction in plants.

229. **Landscape Design.** I. 3 hr. (1 lec., 1 scheduled lab., 1 arranged lab.). A course in ornamental horticulture giving an appreciation of the basic principles of design and information pertaining to the use and care of ornamental plants around the home.

242. **Small-Fruits.** I. 3 hr. (2 lec., 1 scheduled lab.). PR: Plant Sci. 52, Hort. 107, or consent. The taxonomic, physiological and ecological principles involved in the production and handling of small-fruits.

243. **Physiology of Vegetables.** I. 3 hr. (2 lec., 1 scheduled lab.). PR: Plant Sci. 52. Physiological and ecological principles involved in the production of vegetable crops.

244. **Handling and Storage of Horticultural Crops.** II. 3 hr. (2 lec., 1 scheduled lab.). PR: Plant Sci. 52, Chem. 16. Characteristics of perishable crops. Methods and materials employed to maintain quality.

245. **Greenhouse Management.** II. 3 hr. The greenhouse as a controlled plant environment. A study of how to manipulate factors influencing plant growth and development within the specialized environment of greenhouses.

301. **Post-Harvest Physiology.** II. 3 hr. (1 lec., 2 labs.). Physiology and biochemistry of harvested crops.

Plant Pathology

Plant Path.

153. **Forest Pathology.** I. 3 hr. PR: Biol. 2, F.M. 211. Important diseases of forest and shade trees. Causes and methods of control.

180. **Assigned Topics.** I, II, S. 1-4 hr. per sem.

201. **General Plant Pathology.** I. 4 hr. Nature and causes of plant diseases; methods of control.

301. **Diseases of Economic Plants.** I, II, S. 1-3 hr. per sem. 2 hr. in Summer. PR: Plant Path. 201 or 303 or consent. Recognition, cause, and control of diseases of economic plants; Sem. I, Diseases of vegetable crops and of tree and small fruits; Sem. II, Diseases of ornamental plants and field and forage crops; S, Diseases of forest trees. Students may register for 1-3 hr. in Sem. I and II, 2 hr. in Summer, until 8 hours credit are accumulated. Offered in 1973-74 and in alternate years.

302. **Principles of Plant Pathology.** II. 4 hr. PR: Plant Path. 153, 201, or 303, or consent. Primarily for graduate students and seniors majoring in biology or agricultural science. Nature of disease in plants with practice in laboratory methods. (Offered in even years.)

303. **Mycology.** I. 4 hr. Lectures, field and laboratory studies of parastic and saprophytic fungi.

309. **Nematology.** II. 3 hr. Primarily for graduate students majoring in the agricultural sciences or biology. Nematode taxonomy, bionomics, and control, with particular emphasis on plant parasitic forms. Offered in Spring of odd years.

Division of Resource Management

Faculty

Kenneth D. McIntosh, Ph.D. (U. Wisc.), *Director, Division of Resource Management, Professor of Agricultural Economics and Agricultural Economist.*

Victor F. Amann, Ph.D. (U. Minn.), *Adjunct Associate Professor of Agricultural Economics and Chief of Party. (Makerere University, Kampala, Uganda.)*

John R. Anania, M.S. (U. Tenn.), *Instructor in Agricultural Economics and Member, Allegheny Highlands Project.*

Paul V. Armbrester, M.S. (WVU), *Assistant Professor of Agricultural Education and Assistant to the Dean.*

Alfred L. Barr, Ph.D. (Okla. St. U.), *Director, Division of Animal and Veterinary Sciences and Professor of Agricultural Economics and Agricultural Economist.*

Troy L. Bunch, M.S. (U. Guelph), *Assistant Professor of Landscape Architecture.*

Russell C. Butler, Ph.D. (Cornell U.), *Professor Emeritus of Agricultural Education.*

James H. Clarke, Ph.D. (U. Minn.), *Professor of Agricultural Economics and Agricultural Economist.*

Clifford W. Collier, Jr., M.L.A. (U. Ga.), *Associate Professor and State Extension Landscape Architect.*

Edmond B. Collins, M.S. Ag.E. (WVU), *Associate Professor of Agricultural Engineering and Chief of Party, (Egerton College, Njoro, Kenya).*

Dale K. Colyer, Ph.D. (U. Wisc.), *Professor of Agricultural Economics and Agricultural Economist.*

Walter H. Dickerson, P.E., M.S. Ag.E. (VPI), *Professor of Agricultural Engineering and Agricultural Engineer.*

Robert G. Diener, Ph.D. (Mich. St. U.), *Associate Professor of Agricultural Engineering and Associate Agricultural Engineer.*

Gerald V. Eagan, Ph.D. (U. Tenn.), *Assistant Professor of Agricultural Economics and State Extension Specialist—Agricultural Economics.*

Kendall C. Elliott, M.S. Ag.E. (WVU), *Assistant Professor of Agricultural Engineering and Assistant Agricultural Engineer.*

Roy E. Emerson, M.S. (Cornell U.), *Associate Professor of Agricultural Engineering and Associate Agricultural Engineer.*

Homer C. Evans, Ph.D. (U. Minn.), *Professor of Agricultural Economics and Agricultural Economist, Associate Director of Agricultural Experiment Station, and Associate Dean, College of Agriculture and Forestry.*

Ernest C. Goff, *Research Assistant in Agricultural Economics.*

Charles R. Grafton, M.S. Ag.E. (WVU), *Assistant Professor of Agricultural Engineering, (Egerton College, Njoro, Kenya).*

Kenneth J. Hock, M.S. (U. Wisc.), *Assistant Professor of Agricultural Economics and Assistant Agricultural Economist.*

Oscar C. Hutchison, Jr., M.S. (WVU), *Assistant Professor of Agricultural Education and Area Director, Beckley Area, Appalachian Center.*

Robert L. Jack, Ph.D. (Penn. St. U.), *Professor of Agricultural Economics and Agricultural Economist.*

Warren G. Kelly, Ed.D. (U. Mo.), *Associate Professor of Agricultural Education and Education.*

John P. Kuehn, Ph.D. (U. Tenn.), *Assistant Professor of Agricultural Economics and Assistant Agricultural Economist.*

Alon Kvashny, M.L.A. (U. Mich.), *Assistant Professor of Landscape Architecture and Assistant Landscape Architect.*

Mike Wun-Min Lin, M.S. (U. Wis.), *Assistant Professor of Landscape Architecture.*

George W. Longenecker, M.F.A. (U. Ill.), *Assistant Professor of Landscape Architecture.*

A. D. Longhouse, P.E., Ph.D. (Cornell U.), *Professor of Agricultural Engineering and Agricultural Engineer.*

O. Claude McGhee, Ph.D. (Ohio St. U.), *Associate Professor of Agricultural Education and Education.*

Robert H. Maxwell, Ph.D. (Cornell U.), *Associate Professor of Agricultural Education, and Director, Allegheny Highlands Project.*

Joseph L. Morris, M.S. Agr. (WVU), *Assistant Professor of Agricultural Education and Area Director, Morgantown Area, Appalachian Center.*

Ralph E. Nelson, Ph.D. (U. Minn.), *Professor of Agricultural Economics and Provost, Off-Campus Education.*

Ernest J. Nesius, Ph.D. (Iowa St. U.), *Benedum Professor of Agricultural Economics.*

Paul E. Nesselroad, Ph.D. (Penn. St. U.), *Associate Professor of Agricultural Economics and Associate Agricultural Economist.*

Dickson W. Parsons, Ph.D. (Cornell U.), *Professor Emeritus of Agricultural Education.*

Charles I. Rhodes, M.S. (WVU), *Research Assistant in Agricultural Education.*

Arthur W. Selders, M.S. Ag.E. (U. Mass.), *Associate Professor of Agricultural Engineering and State Extension Specialist—Agricultural Engineering.*

Ronald L. Stump, M.S. (WVU), *Associate Dean, Appalachian Center, and Associate Director, Cooperative Extension Service and Assistant Professor of Agricultural Economics.*

John B. Swecker, M.S. (WVU), *Adjunct Associate Professor of Agricultural Education, (Egerton College, Njoro, Kenya).*

Mary E. Templeton, M.S. (WVU), *Professor of Agricultural Economics and Agricultural Economist.*

George E. Toben, M.S. (U. Ill.), *Professor of Agricultural Economics and Agricultural Economist.*

F. Wayne Weber, M.S. (WVU), *Agricultural Research Economist, Economic Research Service, United States Department of Agriculture.*

Virgil L. Whetzel, M.S. (WVU), *Agricultural Research Economist, Economic Research Service; United States Department of Agriculture.*

Programs

The Division of Resource Management was created on July 1, 1969, when the College of Agriculture and Forestry was restructured. As a part of this structural reorganization, the Departments of Agricultural Economics, Agricultural Education, Agricultural Engineering, and the Landscape Architecture unit within the Department of Horticulture were combined to form the Division of Resource Management. Subsequently these four units became Committees within the Division.

Within the Division four curriculums are available for students to choose among at the baccalaureate level: Agribusiness, Agricultural Education, Agricultural Mechanics, and Landscape Architecture.

Bachelor of Science in Agriculture

AGRIBUSINESS CURRICULUM

(Minimum Hours 136)

This curriculum provides an opportunity to specialize not only in agriculture but also in related business aspects of this field. It is designed to prepare students to manage or assume positions of professional management leadership in many businesses engaged in service and supply, production, processing and distribution of agricultural equipment, products, and supplies. It also is designed to provide the necessary flexibility to insure adequate preparatory training for those students who desire to become professional agricultural economists and who may choose employment in such activities as extension, research, and teaching for educational institutions, federal and state governments, or private firms. Individuals with training which can be obtained under this curriculum are often sought for employment in a wide number of occupations such as agricultural economists, business managers, conservation economists, farm managers, price or cost analysts, agricultural product buyers, manufactured products salesmen, credit managers, resource development specialists, price reporters, agricultural statisticians, market administrators, and other employment where a knowledge of both agriculture and business is a desirable attribute.

Curriculum Requirements

Requirements	*Hours*
English Composition and Rhetoric (or conformity with WVU English requirements)	6
Arts and Humanities (Group A) (Must include Introduction to Logic)	12
Social and Behavioral Sciences (Group B included) (Must include 6 credits of Principles of Economics and at least 3 credits in each: Psychology, Sociology, Political Science, and History)	18
Natural Sciences (Group C) (Must elect a minimum of 4 credits in chemistry, 4 credits in biological science, 3 credits in college algebra or equivalent)	12
Courses in Agriculture	45

Elect a minimum of 3 credits in each of the following:

1. Animal Science
2. Plant Science
3. Soil Science

Elect a minimum of 15 credits in Agricultural Economics.
Elect additional courses to obtain a total of 45 credits in Agr.

Courses in Business and Economics	15
Physical Education	2
Free Electives*	26
Total	136

*Student may elect to take courses in Military Science (ROTC) or Air Force Aerospace Studies (ROTC).

AGRICULTURAL EDUCATION CURRICULUM

(Minimum Hours 136)

The main purpose of agricultural education is to educate those who would be teachers of vocational agriculture.

A good vocational agriculture teacher can assist in the economic and social development of a community. One can accomplish this by teaching a total program of vocational agriculture, in and through the high school. Day, young farmer, adult farmer, and off-farm agricultural occupations classes and groups, taught through supervised occupational experience programs, are the tools with which the vocational teacher helps build a more desirable community.

Curriculum Requirements

Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C included) (Must elect a minimum of 8 credits in biology; 8 credits in chemistry; 3 credits in college algebra or equivalent)	24
Courses in Agriculture	45
Elect a minimum of 3 credits in each of the following: 1. Animal Science 2. Plant Science 3. Soil Science 4. Agricultural Economics	
Elect additional courses to obtain the total of 45 credits in Agr.	
Physical Education	2
Free Electives*	35
Total	136

*Student may elect to take courses in Military Science (ROTC) or Air Force Aerospace Studies (ROTC).

Students pursuing this program will meet requirements for certification by the West Virginia Department of Education. The program provides students with the opportunity to become qualified to teach in the broad field of vocational agriculture as well as to become especially prepared to teach in agricultural production and management, animal processing, agricultural mechanics, agricultural sales and services, conservation, horticulture produce industry, or ornamental horticulture. Students in agricultural education have an opportunity to study extension education also in preparation for careers in extension activities.

A student selecting the comprehensive field for vocational agriculture teaching shall complete the above listed curriculum requirements. It also is suggested that each student choose one of the following options to guide his program of study.

A.	Agricultural Production and Management	17
	Animal Science	3
	Forestry	3
	Plant Science	3
	Agricultural Economics	2
	Electives	6
B.	Animal Processing	17
	Dairy Products	5
	Poultry	2
	Meats	3
	Electives	7
C.	Agricultural Mechanics	17
	Farm Shop	3
	Electricity	3
	Farm Power	3
	Farm Structure	3
	Electives	5
D.	Agricultural Sales and Service	17
	Accounting	3
	Marketing	3
	Finance	3
	Cooperatives	3
	Electives	5
E.	Conservation	17
	Forestry	3
	Natural Resources	3
	Conservation	3
	Recreation	2
	Landscape Theory	2
	Electives	4
F.	Horticulture Produce Industry	17
	Plant Physiology	3
	Small Fruits	3
	Vegetables	3
	Greenhouse Management	3
	Electives	5

G.	Ornamental Horticulture	17
	Ornamental Horticulture	6
	Floriculture	3
	Landscape Design	3
	Electives	5

AGRICULTURAL MECHANICS CURRICULUM

(Minimum Hours 136)

Students pursuing the curriculum outlined below in Agricultural Mechanics will have opportunity to become familiar with the several branches of agricultural mechanics including:

1. Soil and water conservation, which includes erosion control, irrigation and land drainage.

2. Electricity and its application to agriculture including its generation, distribution, and use, in the processing, handling, and storage of agricultural products.

3. Storage and environmental structures for plants and animals.

4. Farm power including all types of internal combustion engines, their principles of operation, care, lubrication and maintenance.

5. Field tillage, planting, cultivation, conditioning and harvesting machinery.

Upon completion of the course of study, opportunities for employment are with farm machinery and equipment manufacturers, producers of agricultural products, sales and service enterprises, electric power suppliers, and with state and federal agencies.

Curriculum Requirements

Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C included)	24
(Must elect a minimum of 8 credits in biology; 8 credits in chemistry; 3 credits in college algebra or equivalent)	
Courses in Agriculture	45
Elect a minimum of 3 credits in each of the following:	
1. Animal Science 3. Soil Science	
2. Plant Science 4. Agricultural Economics	
Elect additional courses selected from offerings in the Division of Agriculture to obtain the total of 45 credits in Agr.	
Physical Education	2
Electives°	35
Total	136

°Student may elect to take courses in Military Science (ROTC) or Air Force Aerospace Studies (ROTC).

SUGGESTED SCHEDULE OF COURSES FOR A B.S. IN AGRICULTURE DEGREE WITH A MAJOR IN AGRICULTURAL MECHANICS

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3
Math. 3	3	Math. 4	3
Chem. 11 or 15	4	Chem. 12 or 16	4
Biol. 1	4	Biol. 2	4
Phys. Ed. 1	1	Phys. Ed. 2	1
	15		15

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Econ. 51	3	Econ. 52	3
A & VS	4	Agr. 52	4
Ag. Mech. 10	3	Agron. 2	4
E. 1	3	Sp. Com. 10 or 11	3
C.E. 1	2	E. 2	3
Group A elective	3		
	18		17

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Physics 1	4	Physics 2	4
Ag. Mech. 152	3	Ag. Mech. 259	3
Ag. Econ. 10		Ag. Sci. elective	3
Ag. Econ. 104	4 or 3	English 8	2
Bact. 141	4	Free electives	6
Group B elective	3		
	18 or 17		18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Ag. Mech 275	3	Ag. Mech. 253	3
Ag. Econ. 261 or 206	3	Ag.. Mech. 270	3
Ag. Sci. elect.	2 or 3	English elective	3
English 8	3	Group B elective	3
Free electives	6	Free electives	6
	17 or 18		18

Bachelor of Science in Landscape Architecture

The profession of landscape architecture offers the opportunity to be involved in improving the quality of the environment. The profession deals with the planning and sensitive design of land areas for the utility of man and the esthetic enrichment of his needs. This may range from the planning and design at the regional macro-scale to the urban micro-detail.

The primary educational goals of the curriculum are:

To prepare students who are professionally proficient and technically competent in the design of outdoor spaces for social interaction.

The education of students regarding the natural factors which influence the form and kind of development of use areas.

To introduce the students to the principles of land planning at all scales of development.

The curriculum exposes the student to a wide range of environmental design problems related to the satisfaction of man's social and physical needs. The program emphasizes the understanding of relationships between the natural and social systems and their manifestations in physical design form.

Curriculum Requirements

(Minimum Hours 136)

Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A)	12

Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C)	
(A minimum of six credits in college mathematics to include trigonometry)	12
Engineering Sciences	2
Horticulture	3
Courses in Landscape Architecture*	54
Physical Education	2
Free Electives	33
Total	136

*In addition, each student will be required to work for at least one Summer or its equivalent in an approved landscape architecture office.

Courses of Instruction

Assigned Topics

In order to be eligible to register in Assigned Topics 180, the student must: (1) be in good standing, and (2) obtain approval of the appropriate Division Director prior to registration.

Resource Management

180. **Assigned Topics.** I, II, S. 1-4 hr. per sem.

Agricultural Economics*

10. **Agribusiness Accounting.** I. 4 hr. Accounting for business managers who do not intend to become accountants. A brief coverage of terminology and methodology; decisions in accounting as directed by executives; interpretations and values from accounts and accounting statements. Visits to business firms required. (Offered in even years.)

104. **Farm Management.** I. 3 hr. Principles in assembling, analyzing, and using farm business records; the use of budgeting in evaluating alternatives.

200. **Land Economics.** II. 3 hr. Classification, development, tenure, use, conservation, valuation, and taxation, of rural, urban, mineral, forest, water, and recreational land resources. Private and public rights in land and the affect of population on the demand for land.

206. **Farm Planning.** I. 3 hr. PR: Senior standing. Principal factors influencing returns on farms; planning use of labor, soil, crops, livestock, buildings and equipment. Farm visits required.

231. **Marketing Agricultural Products.** II. 3 hr. Market organization, market policies and practices and factors affecting the marketing of agricultural products. Tour of market agencies and facilities in Pittsburgh area required.

235. **Marketing Dairy Products.** II. 2 hr. Milk marketing policies and practices, including milk-market orders. (Offered in odd years.)

*Econ. 52 or equivalent is required as a prerequisite for all courses in Agricultural Economics numbered 100 or above.

240. **Agricultural Prices.** I. 3 hr. An analysis of the price-making forces which operate in the market places for the major agricultural commodities. Tour of market agencies and facilities frequently conducted.

261. **Agribusiness Finance.** II. 3 hr. Credit needs for agricultural businesses, financing farm and market-agency firms, and organization and operation of credit agencies which finance agricultural business firms. (Offered in even years.)

271. **Agricultural Policy.** II. 3 hr. An examination of the economic aspects of governmental price programs, production and marketing controls, subsidies, parity, export and import policies, and other programs affecting agriculture. (Offered in odd years.)

330. **Cooperative Organization.** II. 3 hr. Organization, functions, and contributions of cooperatives in an economic system. (Offered in even years.)

342. **Advanced Agricultural Economics.** II. 3 hr. (Offered in even years.)

355. **Resource Analysis.** I. 3 hr. PR: Senior standing. Construction of models consistent with economic reality for allocating the factors of production available on farms, in forests, and in non-farm agricultural businesses to produce profit maximizing plans through the use of linear and dynamic programming and electronic equipment.

Agricultural Education

Agr. Ed.

160. **Materials for and Method of High School Teaching of Vocational Agriculture.** I. 3 hr. PR: Consent. Organization and preparation for teaching vocational agriculture in and through the high school. (Also listed as C&I 160.)

162. **Group Organization and Leadership.** I. 2 hr. PR: Consent. Principles and techniques involved in forming, structuring, developing, and directing organizations for effective professional leadership.

188. **Student Teaching.** I, II. 6 hr. PR: C&I 7, Ed. Psych. 105 and 106. (See C&I 188 requirements.)

260. **Principles of Cooperative Extension.** I. 2 hr. PR: Consent. Background, philosophy, and history of cooperative extension. Activities of county cooperative extension agents and cooperative extension programs in West Virginia. (Offered in even years.)

261. **Methods and Materials in Extension Education.** II. 2 hr. PR: Consent. Organization and preparation for extension teaching and the processes of communication. (Offered in odd years.)

263. **Teaching Young, Adult Farmer, and Off-Farm Agricultural Occupations Classes.** I. 2 hr. PR: Ed. Psych. 105, 106, or consent. Participation in conducting young, adult farmer, and off-farm agricultural occupations classes and school-community food preservation center; organization, course of study, method in teaching, and supervision of the classes, young farmers' association, adult farmers' organizations, and off-farm agricultural occupation organizations in classes.

362. **Program Building in Cooperative Extension.** II. 3 hr. PR: Consent. Organization in relation to program building. Leadership and group action. Over-all working and educational objectives, principles, method, and goals in developing county extension programs. (Offered in even years.)

364. **Organizing and Directing Supervised Farming and Supervised Occupational Experience Programs.** S. 2 hr. PR: Ag. Ed. 160 or consent. Planning programs of supervised farming and supervised occupational experience, supervising and evaluating such programs for day students, young, adult farmer, and off-farm agricultural occupations classes and groups.

Agricultural Mechanics

Agr. Mech.

10. **Principles of Agricultural Mechanics.** I. 3 hr. PR: Math. 3. Introduction to several fields of agricultural mechanics and how they are applied in agriculture and industry. 3 hr. rec.

152. **Shop Theory and Methods.** I, II. 3 hr. A course designed to familiarize students with: (1) up-to-date tools, materials, and shop methods; and (2) acceptable methods of developing basic skills with power and hand tools. 1 hr. rec., 6 hr. lab.

253. **Advanced Farm Machinery.** II. 3 hr. Performance of agricultural equipment including calibration, efficiency, adjustments, and maintenance. Theoretical and practical aspects of selection based on economics, compatibility of machines with other equipment and the farming operation, service, and factors of custom operation. 2 hr. rec., 3 hr. lab.

259. **Farm Structures.** II. 3 hr. Fundamentals of construction, functional requirements, materials, new equipment, and use of laborsaving ideas and machinery. 2 hr. rec., 3 hr. lab.

270. **Electricity in Agriculture.** II. 3 hr. The fundamentals of electrical energy and its application to lighting, power, heating, and control circuits used in agriculture. 2 hr. rec., 3 hr. lab.

275. **Agricultural Engines.** I. 3 hr. Relation of theory to design and operation of internal combustion engines with emphasis on care, operation, and maintenance. Study covers one, two, three, four, six, and eight cylinder engines, both in two and four stroke cycle designs. 2 hr. rec., 3 hr. lab.

352. **Advanced Farm Mechanics.** S. 3 hr. PR: Agr. Mech. 152. Forging, cold-iron work, tool fitting, woodworking. Offers training for teaching shop work in rural high schools. 1 hr. rec., 6 hr. lab. (Offered in the Summer of every third year, beginning in 1972.)

Landscape Architecture

L.A.

20. **Architectural Design.** I. 3 hr. Introduction to the architectural elements involving the expression of a variety of materials in two- and three-dimensional design.

21. **Architectural Design.** II. 3 hr. PR: Consent. A study of the expression of architectural and landscape architectural elements in two- and three-dimensions.

41. **Plants and Design.** II. 3 hr. PR: Consent. Laboratory and field study of woody and herbaceous plants and their use for compositional effects.

50. **Theory of Landscape Architectural Design.** I. 3 hr. PR: Consent. Introduction to basic theory and landscape design principles.

51. **Landscape Architectural Design.** II. 3 hr. PR: Consent. Problems in basic landscape design to acquaint the student with the various materials and to develop his capacity to design in the outdoor space.

112. **History of Landscape Architecture.** I. 3 hr. PR: Consent. A broad survey of the history of the designed human environment with emphasis on the development of landscape architecture. (Offered in even years.)

131. **Landscape Construction.** I. 3 hr. PR: Consent. Preparation of grading plans including specifications and cost estimates.

132. **Landscape Architectural Construction.** II. 3 hr. PR: Consent. Landscape structures, their use in design including selection and use of materials.

140. **Planting Design.** I. 3 hr. PR: Consent. Laboratory and field study of woody and herbaceous plants and their use of compositional effects.

141. **Planting Design.** II. 3 hr. PR: Consent. Continuation of L.A. 140.

150. **Landscape Architectural Design.** I. 4 hr. PR: Consent. Design problems involving private, public and semi-public areas with emphasis on plan analysis, detail and presentation. Problems are integrated with construction and plant materials.

151. **Landscape Architectural Design.** II. 4 hr. PR: Consent. Continuation of L.A. 150.

248. **Design Analysis.** II. 2 hr. PR: Consent. Analysis of planning and design projects with respect to offering solutions to a given problem. (Offered in odd years.)

250. **Landscape Architectural Design.** I. 5-7 hr. PR: L.A. 151 and/or consent. Advanced design, a continuation of L.A. 150 and 151 with more comprehensive problems and in-depth collaborative study.

251. **Landscape Architectural Design.** II. 7 hr. PR: L.A. 250 or consent. Advanced comprehensive design problems, continuing L.A. 250 theme, but generally requiring individual work.

265. **Regional Design.** I. 3 hr. PR: Consent. Consideration of regional landscapes in order to effectively relate design to the ecology and development of a region. (Offered in odd years.)

276. **Recreation Planning.** I. 3 hr. PR: Consent. Design of park and recreation areas involving park history, classification theory, and administration.

284. **Professional Practice.** II. 2 hr. PR: Consent. The profession of landscape architecture involving the procedures in the preparation of contract documents, fees, estimates, operation of an office, and the relationship to clients and contractors. (Offered in even years.)

College of Arts and Sciences

GENERAL INFORMATION

Three classes of students enroll in the College of Arts and Sciences: students working toward a degree in the College, those pursuing a preprofessional curriculum in anticipation of earning a bachelor's degree in a professional school, and "special" students who are not degree candidates.

The College includes a lower division which consists of the first and second years and an upper division which consists of work of the third and fourth years. A student may enter the upper division when he has established a minimum of 58 hours of credit with a grade-point average of 2.0 or better. In addition, for entry into the upper division, the Department of Chemistry requires a 2.0 average in all chemistry courses, and the Department of Mathematics requires a 2.5 average in all mathematics courses.

Students earning degrees in Arts and Sciences fulfill certain broad basic-education requirements and study at least one subject in some depth. In addition they have an opportunity to incorporate a number of electives into their programs of study. The degree requirements in Arts and Sciences are intended to serve these educational objectives:

I. *General Culture*: A part of the work of the lower division is intended to carry forward what is usually termed "a general education." It rounds out the program of studies pursued in high school and promotes full development of the student as an individual and as a member of society. Ideally, the student should undergo a well-proportioned development intellectually, spiritually, physically, and emotionally. The end of such development should be an inner balance or stability on the basis of which further growth can take place. Development of the individual as a member of society is to be measured in terms of his or her usefulness and sense of responsibility to the social order. The student should develop the capacity for intellectual participation as a citizen in the community, state, country, and world. A general education should, therefore, provide for all students a meaningful experience appropriate to the individual and social needs which all citizens have in common as members of a free society in the contemporary world.

II. *Specific Attributes*: Most of the attributes of a liberal arts education can be placed in one of three categories: *attitudes*, *knowledge*, and *skills*.

The following *attitudes* should be attained as a result of a general education:

1. An attitude of tolerance or open-mindedness, characterized by a cosmopolitan outlook that will enable the student to see beyond the limits of his own profession, his own economic status, and his own country.

2. An attitude of truth-seeking characterized by scientific objectivity and motivated by intellectual curiosity.

3. An attitude of intelligent appreciation towards nature and the arts that will, as far as the student's own endowments will permit, help him in his aesthetic and ethical choices; and

4. An attitude of dispassionate self-appraisal, based on an understanding of his own nature and characterized by an awareness of his own mental strengths and weaknesses.

The areas of *knowledge* which should be common possession of all educated persons may be conveniently grouped into two divisions:

1. A knowledge of man as a social and intellectual being, of his place in contemporary civilization, and of that civilization's place in the history of man.

2. A knowledge of man as an organism and of man in his relation, direct or indirect, to the biological and physical environment in which he lives.

Three basic *skills* are regarded as indispensable to all educated persons:

1. Skill in self-expression and communication including writing, speaking, reading and listening.

2. Skill in calculation, including a knowledge of, and some skills in, basic mathematics.

3. Skill in the use of at least one foreign language, both as a tool and as an aid in the sympathetic understanding of peoples who do not speak our language.

Education in Breadth and Education in Depth

In his first two years the student normally takes broad basic courses which serve his general education and courses which are preparatory to the specialized work for the major.

Work of the upper division provides intensive study in some one field of knowledge which is designated as the student's major. It is based on the belief that an educated man or woman knows something of several branches of knowledge and knows at least one subject in depth. The student may also have one or two minor concentrations in the upper division.

The Major Subject

In the upper division the student concentrates on a major selected from the following list of subjects:

Biology	Geology	Physics
Chemistry	German	Political Science
Computer Science	History	Psychology
Economics	Latin	Sociology
English	Library Science	Spanish
French	Mathematics	Speech Communication
Geography	Philosophy	Statistics

Interdepartmental Major

A student who wishes to pursue a study program that involves more than one major subject should consult with a faculty member in the department offering the greatest number of courses relevant to the proposed topic, and then with faculty members in one or more of the departments offering courses

appropriate to his needs. After the area of concentration is delineated and faculty cooperation is assured, the student should submit a proposal for an interdepartmental major to the Interdepartmental Major Committee of the College (at the office of the Assistant Dean for Instruction).

The proposal should include: (a) a detailed statement of the area of concentration to be studied; (b) a listing of the courses that would constitute the program of study; (c) the reasons that the student wishes to pursue an interdepartmental major rather than an existing program already offered by one of the College's departments; and (d) a statement from the faculty members with whom the student has conferred, indicating that they have reviewed the proposal and agree to serve as an advisory committee with one of them designated as chairman.

Further information may be obtained from the office of the Assistant Dean for Instruction, College of Arts and Sciences.

Student Class Schedules

Each student schedules his courses according to the curriculum he has chosen. A second-year student who has not completed all required courses listed in the first year of the curriculum that he is following should schedule such courses before scheduling new courses. A student should not be registered for an upper-division course not provided in his lower-division curriculum unless he has satisfied all lower-division requirements or has scheduled the courses necessary to meet those requirements.

Absences

The College of Arts and Sciences emphasizes the following WVU regulations governing attendance:

Students who are absent from class for any reason are responsible for work missed.

Students should understand that absences may jeopardize their grade or continuance in a course.

Instructors who use absence records in determining grades must announce this fact to the students (in writing) within the first five class meetings.

It is the instructor's responsibility to keep an accurate record of all students enrolled in his classes.

Instructors may report excessive absences to the student's dean or adviser.

Honors Program

The Honors Program at WVU exists through the cooperation of fourteen departments all of which offer lower-division, general courses to selected students and several of which are now developing special programs for their majors. Honors sections are small enough to permit more discussion of the material and more individual attention by the instructor than exists in other classes.

A student in the Honors Program normally takes one Honors course each semester of his first two years. Experiences in his junior and senior year depend upon his major department. Typically they involve independent study, participation in research activity, or enrollment in special topics. Being in the

program also qualifies students for privileges such as stack permits at the library and counseling for graduate fellowships and scholarships. Further information may be obtained by writing Coordinator, Honors Program, Woodburn Hall.

Credit by Examination

Any student may petition to receive credit by examination for any course listed by a department as one for which credit by examination is awarded. Applications, course lists, and examination schedules are available at the Academic Advising Center of the College of Arts and Sciences.

A student may apply for such credit in a course if (a) he is at the time of examination registered in the University; (b) his official record does not show credit for the course he wishes to take by examination (i.e. any grade of S, P, D, C, B, A, or I); (c) he is not officially enrolled in the course at the time of examination. (A student who withdraws from a course is officially enrolled in that course until the end of the semester in which the course was elected.)

Bureau for Government Research

The Bureau for Government Research makes studies of problems of state and local government, provides consulting assistance to West Virginia governments, presents training programs for government officials, and issues publications periodically.

O. B. Conaway, Jr., Ph.D. (Syracuse U.), *Director.*
Ralph F. Garn, M.P.A. (Brigham Young U.), *Research Associate.*
Allan S. Hammock, M.A. (Georgetown U.), *Research Associate.*
Herman Mertins, Jr., Ph.D. (Syracuse U.), *Research Associate.*
William R. Ross, M.A. (WVU), *Research Associate.*
David G. Temple, Ph.D. (U. Va.), *Research Associate.*
David G. Williams, Ph.D. (SUNY), *Research Associate.*

REQUIREMENTS FOR DEGREES

All candidates for degrees in the College of Arts and Sciences must fill out an application for graduation and diploma at the Academic Advising Center. Candidates should make such application during the second semester of their junior year in order to have their records evaluated as to College and University requirements. Application *must* be made at least one month prior to the end of the semester or term in which the candidate expects to be graduated. No candidate can be graduated without such application.

Bachelor of Arts Degree

The Bachelor of Arts degree in the College of Arts and Sciences is conferred upon a student who complies with the general regulations of the University concerning degrees and satisfies all entrance, college, and departmental requirements.

Bachelor of Science Degree

The Bachelor of Science degree is conferred upon a student who complies with the general regulations of the University concerning degrees, satisfies all entrance and college requirements, and completes the requirements of one of the following fields: Chemistry, Computer Science, Geology, Physics, Statistics.

A Second Bachelor's Degree

A student who has received a bachelor's degree in one department or college of WVU may become eligible for a second bachelor's degree by earning an additional 30 semester hours in residence in the College of Arts and Sciences and meeting all requirements, departmental and otherwise, of the second bachelor's degree.

Basic Requirements for All Degrees

I. *Physical Education.* Two hours of physical education, to be taken during the first year of residence, are required by WVU for graduation. The requirement is waived for transfer students entering WVU with 58 or more transfer credits, and for physically handicapped students upon certification by a physician of the University Health Service ..... 2 hr.

II. *English Composition.* Each undergraduate must complete one year of English composition and rhetoric (English 1, 2) unless exempted from part or all of the requirement on the basis of test scores or other evidence of proficiency in composition ..... 6 hr.

III. *Foreign Language.* Two years of study in one language. The student who presents two or more units of high school credit in a foreign language may satisfy this requirement by taking courses 3 and 4 or other approved courses in that language but will not receive credit toward his degree by taking courses 1 and 2 in that language. He may, if he wishes, take courses 1, 2, 3, and 4 in a different language for full credit. (For explanation of the various options and other approved courses, consult the listings under *Foreign Languages* in this *Catalog.*) ..... 6-12 hr.

IV. *Core Curriculum Requirements.* The Core Curriculum requirements apply to all undergraduate students in the University. They are intended to insure that all students will encounter a broad spectrum of subject matter in their baccalaureate curricula. Each student must earn a minimum of twelve credit hours in each of the three Core Groups, except that two four-credit courses and one three-credit course may be used to satisfy the requirement in any group. Credit must be earned in at least two subjects in each group.

Core A: Art, Drama, English (exclusive of 1, 2), Humanities, Foreign Languages and Literature (beyond credits submitted to meet the foreign language requirement III, above), Music, Philosophy, Religious Studies, Speech Communication ..... 12 hr.

Core B: Economics, Geography, History, Political Science, Psychology, Social Science, Sociology, Forestry 140 ... 12 hr.

Core C: Astronomy, Bacteriology, Biology, Chemistry, Entomology, Genetics, Geology, Mathematics, Nutrition, Physical Science, Physics, Physiology, Statistics ..... 12 hr.

In satisfying the Group C requirements, the Arts and Sciences student must have laboratory experience. The College strongly recommends a full year in one science.

V. *Upper-Division Departmental Requirements* in the major subject (18-24 hours), and in one or more minor subjects if required by the department. A minimum of 18 upper-division hours in the major subject is required.

VI. *Electives,* as approved by the department adviser, to complete the minimum number of hours required for graduation.

VII. *Grade-Point Average.* An overall grade-point average of at least 2.0 is required for courses attempted in the major subject. Individual departments may require a grade of C or higher for certain specified required courses. A cumulative average of 2.0 is required for graduation.

To establish a major sequence and to qualify for graduation, the student must have spent at least two semesters and have accumulated a minimum of 30 semester hours, as an upper-division student in the department of his major, or under its guidance.

Except with the approval of the department chairman, no upper-division course in the major, taken at another institution, will be counted toward meeting the requirements of the major department.

NOTE:

Mathematics: WVU requires proficiency "equal to that normally attained in two years of high-school mathematics." A student who, upon entering, fails to meet this standard will be required to take remedial work in mathematics.

Regulations Affecting Degrees

A total of 128 hours is required for the Bachelor of Arts degree. The Bachelor of Science degree in Computer Science, Geology, and Statistics requires 134 hours; in Chemistry and Physics, 136 hours.

The following may *not* be counted toward the hours required for graduation:

(a) Foreign Language courses 1 and 2 (or 21, 22, or 31, 32) if the student has presented two or more units of high school credit in the same language.

(b) Fewer than six hours in Foreign Language courses numbered 1 and 2 (or 21, 22, or 31, 32) unless additional work in the same language is offered.

(c) Mathematics 0, 1, 2.

(d) Courses in which the grade received is other than A, B, C, D, P, or S. Credit by examination, however, is counted toward hours required for graduation unless it was granted for courses otherwise excluded in this list.

(e) Any course passed more than once, unless a course is designated as repeatable and is so described in this *Catalog*.

(f) More than 42 hours in one departmental subject for a Bachelor of Arts degree. (In the case of English language and literature, the 42-hour

maximum is exclusive of credits in English 1 and 2.) As much as 60 hours may be presented from a department that offers more than one subject (e.g. Foreign Languages).

(g) More than 8 hours of first- and second-year Military Science (ROTC) or Air Force Aerospace Studies (ROTC) courses.

(h) More than 6 hours of third- and fourth-year Military Science (ROTC) or Air Force Aerospace Studies (ROTC) courses.

(i) More than 72 hours of transfer credit from accredited junior colleges.

(j) Courses completed in a junior college subsequent to attaining junior or higher rank by the student at WVU.

(k) In addition to (1) work conducted by other faculties but recognized as a regular part of the program of the College of Arts and Sciences, (2) work offered toward fulfillment of the Core Curriculum, and (3) non-Education courses required for teacher certification, a student may establish credit not to exceed 24 semester hours in approved courses outside the College. The credit that may be transferred from any one college or school shall not exceed 21 hours in Education and 15 hours in any other one college or school. Under this provision, clinical and skill courses taken in other schools or colleges will not be accepted for credit in the College of Arts and Sciences.

PREPARATION FOR THE STUDY OF MEDICINE OR DENTISTRY

Students preparing for the study of medicine or dentistry may satisfy the requirements for entrance into medical or dental school by majoring in any Arts and Sciences subject and including in their undergraduate course selections the following or their equivalents: Biol. 1, 2 (8 hr.); Chem. 15, 16, 133-135, 134-136 (16 hr.); Physics 1, 2 (8 hr.); and social studies (6 hr.). These requirements overlap those of the Core Curriculum, which must be satisfied by all students. All departments in Arts and Sciences offer a major which accommodates the above courses.

Some students are admitted to a school of medicine or dentistry after completing three years of undergraduate work. These students may earn the bachelor's degree by completing three years in Arts and Sciences and one year in a medical or dental school only if they major in one of the sciences. In the case of biology, courses taken in the first year of medical school may be credited to the departmental major. The substitution of one or more first-year medical school courses for courses in the major may be permitted in one or two other departments.

PRE-PROFESSIONAL COURSES

(Not leading to the degrees in the College of Arts and Sciences)

(A). Pre-Business and Economics

Candidates for the degree of B.S. in Business Administration and those for the degree of B.S. in Economics are registered in the College of Arts and Sciences during their freshman and sophomore years. Such students are eligible to transfer into the College of Business and Economics when they have completed 58 or more credit hours.

The courses taken in the first two years should include (1) the courses required in the WVU Core Curriculum and (2) those lower-division courses which are required in the College of Business and Economics curricula. The following are the lower-division courses which are specifically required in these curricula, in addition to those already named as required for admission to the College: Pol. Sci. 2, Psych. 1, Sociol. 1, Math. 3 and 8, and Speech Com. 11. The curriculum for the B.S. Bus. degree requires English 8. The College of Business and Economics curricula also require, in addition to all courses in economics and the above-named social science courses, 6 hours of electives from the fields which are included in Core Group B.

Econ. 51 and 52 are prerequisites to all upper-division courses in the College of Business and Economics. It is thus particularly important that these be completed *no later than the first semester of the sophomore year.*

Effective for students who began their college or university work in August, 1969, or later, Econ. 125 (Statistics) must be completed or being taken while any 100-level course offered by the College of Business and Economics may be scheduled. Pre-business or economics students are restricted to courses in the business and economics core (21 hours) and certain specified electives until Econ. 125 is completed successfully.

A total of 128 hours, exclusive of any credit for Math. 2, is required for graduation from the College of Business and Economics.

Economics may also be taken as a major in the College of Arts and Sciences. See page 125.

SUGGESTED PROGRAM FOR PRE-BUSINESS AND ECONOMICS

First Year				Second Year			
*First Sem.**	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Acctng. 51	3	Acctng. 52	3
Econ. 51	3	Econ. 52	3	Math. 8	3	Econ. 125	3
Pol. Sci. 2	3	Math. 3	3	Speech Com. 11	3	Electives—	
Psych. 1	3	Sociol. 1	3	Electives—		Core A	3
Phys. Ed. 1	1	Phys. Ed. 2	1	Core A	3	Core B	3
Elective—		Elective—		Core B	3	English 8	3
Core C	3	Core C	3				
	16		16		15		15

*The student deficient in mathematics, as evidenced by the ACT scores, must take Math. 2, the remedial course in algebra, during the first semester in residence in order to prepare for Math. 3 and Math. 8 required in subsequent semesters.

(B). Pre-Education

Candidates for the degree of Bachelor of Science in Secondary Education and Bachelor of Science in Elementary Education are registered in the College of Arts and Sciences until they have completed 58 hours or more of academic work in the lower division of the College, with a grade-point average of 2.25. They then transfer to the College of Human Resources and Education, Division of Education. During the pre-Education period students are advised to complete as many as possible of the courses in general studies required by the Division of Education and for state certification.

In addition to the above general academic requirements, students preparing to teach in high school or elementary school are advised to complete as many as possible of the required academic courses in two teaching fields or one comprehensive field.

Attention is called to certain requirements of undergraduate programs in the Division of Education:

1. For admission to the Division, a grade-point average of 2.25 on all work attempted.

2. For enrollment in the student teaching block, a grade-point average of 2.25 on all work attempted, and a grade-point average of 2.00 in each teaching field and in Education courses.

3. For registration in professional education courses beyond Educ. Psych. 106, completion of requirements for C&I 7.

Teaching Certificates

The Dean of the College of Human Resources and Education is authorized to recommend all applicants for teaching certificates.

High-school teaching certificates may be obtained by students registered in the College of Arts and Sciences, as well as in the College of Human Resources and Education, provided they meet the requirements for certification. To qualify for the elementary-school teaching certificate, students will transfer to the College of Human Resources and Education at the beginning of the junior year.

Candidates for the Bachelor of Arts degree who wish to qualify for teaching certificates should indicate this fact to their advisers and plan their entire courses with this in view. Unless this is done by the end of the freshman year, students may encounter difficulties in qualifying for the certificate by the time they receive their degree.

As a check, students should consult each semester with the adviser of pre-Education candidates for high-school or elementary-school teaching certificates, in the Academic Advising Center, College of Arts and Sciences, or in the Office of Student Advising and Records in the Division of Education.

(C). Pre-Journalism

Candidates for the degree of Bachelor of Science in Journalism are registered in the College of Arts and Sciences until they have earned at least 58 semester hours of college credit. Studies during the freshman and sophomore years are designed so the student may fulfill nearly all WVU Core Curriculum requirements, while at the same time exposing himself to the varied areas of study so that he may intelligently select a minor field and a journalism specialization.

First Year*		Second Year*	
Journalism 1	2	Journalism 18	3
English 1 and 2	6	Core requirements	
Phys. Ed. 1 and 2	2		
Core requirements			

*Students will be encouraged to take at least 3 more hours of journalism in each of the first and second years. Pre-journalism majors should confer with their advisers about the courses they may elect.

(D). Pre-Medical Technology

This curriculum is designed to satisfy the course requirements for admission to the professional portion of the curriculum in Medical Technology offered by the School of Medicine. The WVU Core Curriculum requirements must be satisfied, and 64 hours total are required for admission to the first professional year.

Students are not transferred automatically from the pre-professional course in the College of Arts and Sciences (first and second years) to the professional course (third and fourth years). Application for admission to the third year should be made on forms which can be obtained from the Assistant to the Dean of Admissions and Records. When completed, the forms are to be returned to that office. Application should be filed before January of the second year.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Chem. 115	4	Chem. 131	4
Chem. 15	4	Chem. 16	4	Physics 1	4	Physics 2	4
Biol. 1	4	Biol. 2	4	Electives*	6-9	Electives*	7-10
Phys. Ed. 1	1	Math. 3	3	Med. Tech. 3**	1		
Elective*	3	Phys. Ed. 2	1				
Med. Tech. 1**	1	Med. Tech. 2**	1				
(Max. Hr. 18)	16	(Max. Hr. 18)	16		15-18		15-18

*Students who plan to do graduate study should elect a foreign language. To meet University Core Curriculum requirements, electives must be chosen from Core Groups A and B. Math. 2, if required, should be taken in the first year.

**Med. Tech. 1, 2, and 3 are not required, but are strongly recommended.

(E). Pre-Pharmacy

The professional curriculum of the School of Pharmacy is based on two years of pre-pharmacy requirements which are:

Algebra	3 hr.	Physics	8 hr.
Trigonometry	3 hr.	Physical Education	2 hr.
English Composition	6 hr.	Electives from	
Principles of Economics	6 hr.	Core A	12 hr.
Biology, General	8 hr.	Core B	6 hr.
Chemistry, General	8 hr.		
Chemistry, Organic	8 hr.	Total	70 hr.

A 2.0 cumulative average in all courses undertaken except Military Science (ROTC), Air Force Aerospace Studies (ROTC), and Physical Education, and a 2.0 cumulative average in all natural science courses undertaken is considered the minimum standard for admission.

For admission to the School of Pharmacy, formal application should be made to the Admissions Committee of the School as early as possible after February 1, but before June 1, preceding the fall term in which the student is seeking enrollment. Complete information may be obtained from the Dean of the School of Pharmacy, or from the Assistant to the Dean of Admissions and Records, Medical Center.

(F). Pre-Physical Therapy

This curriculum is designed to satisfy the course requirements for admission to the professional portion of the curriculum in Physical Therapy offered by the School of Medicine. The Core Curriculum requirements must be satisfied, and a total of 62 hours is required for admission to the first professional year. This suggested curriculum is designed to allow latitude in career choice changes and is basically compatible with various curricula in the arts and sciences.

Students are not transferred automatically from the lower division of the College of Arts and Sciences to the Division of Physical Therapy in the School of Medicine upon completing the recommended curriculum of the first two years. Admission is based on recommendation of the Admissions Committee of the Division.

Application forms for admission may be obtained from the Assistant to the Dean of Admissions and Records, Medical Center, after December 1, and must be filed before March 1 of the second year.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Biol. 1°	4	Biol. 2°	4
Psych. 1°	3	Psych. 2°	3	Psych. 141°	3	Psych. Elective°	3
Chem. 15°	4	Chem. 16°	4	Physics 1°	4	Speech Com. 11°	3
Phys. Ed. 1	1	Phys. Ed. 2	1	English 8	3	Physics 2°	4
Elective°°	3	Math. 4 or		Elective		Elective	3
Math. 3	3	Stat. 101	3	(Core A)	3		
		Elective					
		(Core A)	3				
	17		17		17		17

°Courses required for admission to Division of Physical Therapy.
°°Suggested electives: Foreign Language (6 hr.); Stat. 101; Phil. 1, 2 or 106; Bus. Law 111; Psych. 164, 242, 281, 282; Biol. 266; Finan. 115, 150.

COURSES OF INSTRUCTION AND CURRICULA

ORIENTATION

Orien.

1. **Orientation.** 1 hr. Open only to new students in their first semester at the University. A study of the values, orientation, and emphases which characterize higher education and an explanation of the nature of a university and its role. (Pass-Fail credit only.)

191. **Orientation.** 1 hr. PR: Sophomore or higher standing and consent. Students will participate in Orien. 1 as assistants to faculty teaching Orien. 1. Practicum form of study leading to an understanding of the values, orientations, and emphases which characterize higher education. (Pass-Fail credit only.)

BIOLOGY

Faculty

E. C. Keller, Jr., Ph.D. (Penn. St. U.), *Chairman and Professor of Biology.*
Lila Abrahamson, Ph.D. (U. Mich.), *Associate Professor of Biology.*
Robert D. Allen, Ph.D. (UCLA), *Assistant Professor of Biology.*
Nelle P. Ammons, Ph.D. (U. Pitt), *Professor Emeritus of Botany.*
Charles H. Baer, Ph.D. (U. Md.), *Associate Professor of Biology.*
Elizabeth A. Bartholomew, M.S. (WVU), *Instructor in Biology; Curator of Herbarium.*
Jay Barton II, Ph.D. (U. Mo.), *Professor of Biology; Provost-Instruction.*
Herald D. Bennett, Ph.D. (U. Iowa), *Professor of Biology.*
Arnold Benson, M.A. (U. Colo.), *Assistant Professor of Biology.*
Robert L. Birch, M.S. (Penn. St. U.), *Assistant Professor of Biology.*
David F. Blaydes, Ph.D. (Ind. U.), *Associate Professor of Biology.*
W. Newman Bradshaw, Ph.D. (U. Tex.), *Associate Professor of Biology.*
Kathleen P. Brooks, Ph.D. (U. Calif.), *Instructor (part-time) in Biology.*
Roy B. Clarkson, Ph.D. (WVU), *Professor of Biology; Associate Chairman.*
Jesse F. Clovis, Ph.D. (Cornell U.), *Professor of Biology.*
William E. Collins, Ph.D. (U. Wisc.), *Associate Professor of Biology.*
Mullen O. Coover, M.S. (WVU), *Associate Professor of Biology.*
Earl L. Core, Ph.D. (Columbia U.), *Professor Emertius of Biology.*
John J. DeCosta, Ph.D. (Ind. U.), *Assistant Professor of Biology.*
Dorothy Covalt Dunning, Ph.D. (Tufts U.), *Assistant Professor of Biology.*
Ramsey H. Frist, Ph.D. (U. Pitt), *Associate Professor of Biology.*
Lloyd R. Gribble, Ph.D. (WVU), *Professor Emeritus of Biology.*
Roland L. Guthrie, Ph.D. (WVU), *Assistant Professor of Biology; Arboretum Director.*
John E. Hall, Ph.D. (Purdue U.), *Adjunct Professor of Biology.*
Willis H. Hertig, Jr., Ph.D. (WVU), *Associate Professor of Biology.*
Henry W. Hurlbutt, Jr., Ph.D. (U. Md.), *Assistant Professor of Biology.*
Norman E. Kowal, Ph.D. (Duke U.), *Assistant Professor of Biology.*
Joseph A. Marshall, Ph.D. (U. Md.), *Assistant Professor of Biology.*
Ethel C. Montiegel, M.S. (WVU), *Associate Professor of Biology.*
Charles Norman, Ph.D. (U. Iowa), *Professor of Biology.*
Martin W. Schein, Sc.D. (J. Hopkins U.), *Centennial Professor of Biology.*
Robert C. Spangler, Ph.D. (U. Chicago), *Professor Emeritus of Botany.*
Jerry E. Squires, Ph.D. (Yale U.), *Assistant Professor of Biology.*
Richard P. Sutter, Ph.D. (Tufts U.), *Associate Professor of Biology.*
Leland H. Taylor, Sc.D. (Harvard U.), *Professor Emeritus of Zoology.*
Leah A. Williams, Ph.D. (WVU), *Assistant Professor of Biology.*

Programs

The Bachelor of Arts in Biology is designed to prepare students for professional careers in the life sciences within the framework of the basic Arts and Sciences program. The required courses of the curriculum may be supplemented by proper choice of elective hours to provide preparation for graduate work, professional health sciences, and secondary school teaching.

Teacher certification requirements may be met at the same time A.B. degree requirements are fulfilled. The required work as prescribed by the Division of Education and the WVU Core Curriculum should be planned carefully with a faculty adviser to fit into elective spaces shown in the curriculum.

A three-year, pre-professional program in medicine and dentistry is available in the Department of Biology wherein all courses required by the University and the Department (except the electives of the senior year) are taken before the senior year. Successful completion of course work in the first year of professional school is accepted as electives toward the B.A. degree in Biology. The details of the programs are arranged through the principal departmental undergraduate adviser starting with pre-registration for the First Semester of the sophomore year.

Off-campus field experience in terrestrial, fresh water aquatics and marine biology programs are also available in the summer at three off-campus sites: Terra Alta Biological Station, the Lewes (Del.) Marine Station, and the Wallops Island (Va.) Marine Station. Details may be obtained through the Chairman's office.

SUGGESTED SCHEDULE OF COURSES FOR COMPLETING REQUIREMENTS FOR A.B. WITH A MAJOR IN BIOLOGY

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	Biol. 2	4
English 1	3	English 2	3
Chem. 15	4	Chem. 16	4
Math.	3	Math.	3
Elective*	3	Elective*	3
Phys. Ed. 1	1	Phys. Ed. 2	1
	18		18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Biol. 101	4	Biol. 102	4
Chem. 133	3	Chem. 134	3
Chem. 135	1	Chem. 136	1
Foreign Lang.	3	Foreign Lang.	3
Electives*	6	Electives*	6
	17		17

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Biol. 103	4	Biol. 104	4
Physics 1	4	Physics 2	4
Foreign Lang. (if necessary)	3	Foreign Lang. (if necessary)	3
Electives*	6-9	Electives*	6-9
	17		17

Fourth Year

First and Second Sem.	*Hr.*
Biology electives, to include at least one laboratory course	7-8
Electives*	23-24

*Electives must be chosen to satisfy the WVU Core Curriculum. Others may be chosen in the College of Agriculture and Forestry or the School of Medicine, as well as in the College of Arts and Sciences.

Required courses: Biol. 1, 2, 101, 102, 103, 104; Chem. 15, 16, 133, 134, 136; Physics 1, 2; Math. 3, 4 (may be waived on the basis of ACT tests scores); 15; 16 (Statistics or Computer Science may be substituted for Math. 16.)

In addition to these required courses, biology majors are required to take an additional 7-8 hours of biology. These required electives may be selected from any of the 100 to 200 level courses (other than Biol. 209) listed in the Courses of Instruction in Biology. At least one of these electives must be a laboratory course. With the adviser's approval courses in the College of Agriculture and Forestry and School of Medicine may be selected to satisfy this elective requirement. The student should consult with his adviser in choosing these electives.

Courses of Instruction in Biology

Professors Barton, Bennett, Bradshaw, Clarkson, Clovis, Hall, Keller (*Chairman*), Norman, and Schein; Associate Professors Abrahamson, Baer, Blaydes, Collins, Coover, Frist, Guthrie, Hertig, Hurlbutt, Montiegel, and Sutter; Assistant Professors Allen, Benson, Birch, DeCosta, Dunning, Kowal, Marshall, Squires, and Williams.

Biol.

1. **General Biology.** I, II, S. 4 hr. General introductory course in biology: cellular, physiological, regulatory, taxonomic aspects of biology. (Lab fee $10.00.)

2. **General Biology.** I, II, S. 4 hr. General introductory course in biology: genetic, ecological, behavioral, developmental, and contemporary aspects of biology. (Lab fee $10.00.)

51. **Dendrology (Angiosperms).** I. 2 hr. PR: Biol. 1 and 2 or equiv. Classification and distribution of the angiosperm timber trees of the United States. Primarily for forestry students. (Lab fee $10.00.)

52. **Dendrology (Gymnosperms).** II. 1 hr. PR: Biol. 1 and 2 or equiv. Classification and distribution of the gymnosperm timber trees of the United States. Primarily for forestry students.

91. **Man and His Environment.** (Also listed as Social Science 91.) I. 3 hr. An examination of some of the facets of the environment which most directly affect human welfare. Central focus on environmental deterioration and corrective public policies. An interdisciplinary, non-prerequisite course for students in all parts of the University.

101. **Animals As Organisms.** I. 4 hr. PR: Biol. 1 and 2 or equiv. An integrated study of the organism—development, structure, function, and evolution. Dissection kit required. (Lab fee $15.00.)

102. **Plants As Organisms.** II. 4 hr. PR: Biol. 1 and 2 or equiv. An integrated study of the organism—development, structure, function, and evolution. (Lab fee $20.00.)

103. **Population Biology.** I. 4 hr. PR: Biol. 1 and 2, Math. 4, or consent. A study of biological populations and their environmental relationships. (Lab fee $10.00.)

104. **Cellular and Molecular Biology.** II. 4 hr. PR: Biol. 1 and 2, gen. physics, organic chem., or consent. A study of cell structure and function beginning at the molecular level of organization and proceeding through different levels of complexity. (Lab fee $20.00.)

105. **Honors Investigation.** II. 3 hr. PR: Second Semester of junior year, recommendation of adviser. Biology majors only. Supervised readings, investigation, and study.

106. **Honors Investigation.** I. 3 hr. PR: Biol. 105. Supervised readings, investigation, and study.

107. **Honors Thesis.** II. 3 hr. PR: Biol. 106. Supervised readings, investigation, and study.

151. **Plant Systematics.** II. 4 hr. Classification, ecology, and identifications of local vascular plants. (Lab fee $10.00.)

152. **The Plant Kingdom.** II, S. 4 hr. Study of the evolution, structure, and development of plants beginning with simple plants and proceeding through various levels of complexity to the flowering plants. (Not open to students having credit for Biol. 351 and 352.) (Lab fee $10.00.)

169. **Plant Physiology.** I, II. 3 hr. PR: Chem. 15 and 16, or equiv. Physiochemical processes of plants. (Lab fee $15.00.)

201. **History of Biology.** I. 3 hr. PR: Biol. 1 and 2 or equiv. History of the development of biological knowledge, with philosophical and social backgrounds.

209. **Topics and Problems in Biology.** I, II, S. 1-4 hr. PR: Consent. Topics and problems in contemporary biology. All topics or problems must be determined in consultation with the instructor.

211. **Life Cycle of the Cell.** I. 4 hr. PR: Biol. 104. Advanced study of fundamental cellular activities and their underlying molecular processes. (Lab fee $15.00.)

215. **Cytology.** II. 4 hr. PR: Biol. 1 and 2 or equiv. Cells, their structures and functions. (Lab fee $10.00.)

231. **Behavior of Organisms.** I. 3 hr. PR: Biol. 1 and 2 or equiv. Principles of individual and group behavior. (Lab fee $15.00.)

243. **Plant Ecology.** I. 4 hr. PR: Biol. 1 and 2 or equiv. Environmental and ecological relationships of plants. (Lab fee $10.00.)

246. **Limnology.** I. 4 hr. PR: Biol. 103 or consent. Physical, chemical, and biological characteristics of inland waters with an introduction to the principles of biological productivity. (Lab fee $10.00.)

251. **Principles of Evolution.** I, S. 3 hr. PR: Biol. 1 and 2 or equiv. Introduction to the study of evolution.

252. **Flora of West Virginia.** II, S. 3 hr. PR: Biol. 1 and 2 or equiv. Consideration of native plant life of the state.

253. **Plant Anatomy.** I. 4 hr. PR: Biol. 1 and 2 or equiv. Anatomy of seed plants. (Lab fee $10.00.)

254. **Plant Geography.** II. 3 hr. PR: Biol. 1 and 2 or equiv. Study of plant groupings and world-wide distribution of plants. (Offered in spring of odd years.)

255. **Invertebrate Zoology.** II. 4 hr. PR: Biol. 1 and 2 or equiv. Advanced study of animals without backbones. (Lab fee $10.00.)

256. **Ornithology.** II. 3 hr. PR: Biol. 1 and 2 or equiv. Field and laboratory studies on the identification, migration, protection, nesting, and food habits of birds.

257. **Ichthyology.** II. 3 hr. PR: Biol. 101 or consent. Internal and external structure of fishes, their systematic and ecological relationships, and their distribution in time and space. Dissection kit required. (Lab fee $10.00.)

259. **General Parasitology.** I. 4 hr. PR: Biol. 1 and 2 or equiv. Introduction to the biology of parasites. Dissection kit required. (Lab fee $10.00.)

261. **Comparative Anatomy.** I. 5 hr. PR: Biol. 1 and 2, 101 or equiv. A comparative study of the morphology of selected vertebrates emphasizing functional and evolutionary relationships. Dissection kit required. (Lab fee $15.00.)

262. **Vertebrate Embryology.** II. 5 hr. PR: Biol. 1 and 2, 101 or equiv. Experimental and descriptive approach to the study of the development of vertebrates. (Lab fee $15.00.)

263. **Vertebrate Microanatomy.** II. 4 hr. PR: Biol. 261 or 101 and consent. The structural and functional approach to the study of the tissues and organs of vertebrates. (Lab fee $10.00.)

264. **Comparative Developmental Anatomy.** II. 3 hr. PR: Biol 261. Anatomy and development of the organs and systems of various vertebrates.

265. **Comparative Neuroanatomy.** II. 4 hr. PR: Biol. 101 or 261 and consent. Comparative study of development and anatomy of the nervous systems of the vertebrates. Dissection kit required. (Lab fee $15.00.)

266. **Human Physiology.** I, II, S. 4 hr. PR: Biol. 1 and 2 or consent. Introductory course in the function of man. (Lab fee $10.00.)

267. **Comparative Physiology.** II. 4 hr. PR: Biol. 101 or 266 (or equiv. physiology course) or consent. Study of the diverse ways in which different kinds of animals meet their functional requirements. (Lab fee $20.00.)

268. **Physiology of the Endocrines.** I. 3 hr. PR: Biol. 101 or 266, or equiv., organic chem. or consent. Regulation of the organs of internal secretions and mechanisms of action of the hormones produced.

269. **Physiology of the Endocrines—Laboratory.** I. 1 hr. PR or Conc.: Biol. 268. Experimental techniques used in study of the endocrine system. (Lab fee $15.00.)

309. **Topics in Biology.** I, II, S. 1-4 hr. PR: Consent. Topics in contemporary biology. Topics will be selected by the instructor for formal presentation.

311. **Biology Seminar.** I, II. 1 hr. Discussions and presentations of general interest to biologists.

313. **Problems in Biology.** I, II, S. 1-4 hr. PR: Consent. Problems in contemporary biology. Selection of problem to be determined in consultation with the instructor.

314. **Topics in Cellular and Molecular Biology.** I, II, S. 1-4 hr. PR: Consent. Topics in contemporary cellular and molecular biology. Topic will be selected by the instructor for formal presentation.

316. **Seminar in Cellular and Molecular Biology.** I, II. 1 hr. Selected areas of cellular and molecular biology are presented and discussed.

322. **Topics in Bioscience Education.** I, II, S. 1-4 hr. PR: Consent. Topics in contemporary biology. Topics will be selected by the instructor for formal presentation.

323. **Seminar in Bioscience Education.** I, II. 1 hr. Selected areas of bioscience education are presented and discussed.

333. **Behavioral Ecology.** I. 4 hr. PR: Biol. 231, 103 or consent. Discussion of the influence of external environmental factors on the regulation and control of behavior.

338. **Seminar in Animal Behavior.** I, II. 1 hr. Selected areas of animal behavior are presented and discussed.

339. **Problems in Animal Behavior.** I, II, S. 1-4 hr. PR: Consent. Problems in contemporary animal behavior. Selection of topics to be determined in consultation with the instructor.

342. **Primary Production in Aquatic Environments.** II. 3 hr. PR: Biol. 246 or consent. Lectures and discussions on the methods of measuring primary production and the integration of results of modern studies into ecosystem dynamics.

343. **Plant Communities.** S. 3 hr. PR: Biol. 1 and 2 or equiv. Field studies in the plant ecology of the central Appalachians.

345. **Fisheries Science.** II. 4 hr. PR: Biol. 257 or consent. Population dynamics in relation to principles and techniques of fish management. (Lab fee $8.00.)

346. **Dynamics of Ecosystems.** II. 3 hr. PR: Biol. 103 or consent. Modern concepts in ecology covered through discussion of readings. Topics treated are selected from the areas of population genetics, energy flow, nutrient cycling, and community structure.

348. **Topics in Ecology.** I, II, S. 1-4 hr. PR: Consent. Topics in contemporary ecology. Topics will be selected by the instructor for formal presentation. (Lab fee $4.00.)

349. **Problems in Ecology.** I, II, S. 1-4 hr. PR: Consent. Problems in contemporary ecology. Selection of problems to be determined in consultation with the instructor.

350. **Biosystematics.** I. 3 hr. PR: Biol. 1 and 2 or equiv. Techniques, history, and principles of the systematics of plants and animals.

351. **Plant Morphology (Algae and Fungi).** I. 4 hr. PR: Biol. 1 and 2 or equiv. Development and structure of the algae and fungi. (Lab fee $8.00.)

352. **Plant Morphology (Bryophytes and Vascular Plants).** II. 4 hr. PR: Biol. 1 and 2 or equiv. Development and structure of the bryophytes and vascular plants.

353. **Taxonomy of Vascular Plants.** S. 3 hr. PR: Biol. 1 and 2 or equiv. Field studies in the classification, ecology, and identification of vascular plants.

354. **Fresh-Water Algae.** I. 4 hr. PR: Biol. 1 and 2 or equiv. Taxonomy, cytology, and ecology of the aquatic, aerial, and land forms of fresh-water algae. (Lab fee $8.00.)

355. **Advanced Plant Systematics I.** I. 3 hr. PR: Biol. 151 or equiv. Taxonomy of pteridophytes, gymnosperms, and monocotyledons. (Lab fee $8.00.)

356. **Advanced Plant Systematics II.** II. 3 hr. PR: Biol. 151 or equiv. Taxonomy of dicotyledons. (Lab fee $8.00.)

357. **Aquatic Seed Plants.** I. 3 hr. PR: Biol. 1 and 2 or equiv. Classification, ecology, and identification of aquatic vascular plants.

358. **Field Study of Invertebrates.** S. 3 hr. PR: Biol. 1 and 2 or equiv. Taxonomy and ecology of invertebrates.

359. **Field Study of Vertebrates.** S. 3 hr. PR: Biol. 1 and 2 or equiv. Taxonomy and ecology of vertebrates.

360. **Vascular Cryptogams.** II. 4 hr. PR: Biol. 1 and 2 or equiv. Taxonomy, anatomy, cytology, and ecology of the club mosses, horsetails, and ferns. (Lab fee $8.00.)

362. **Developmental Biology.** I. 3 hr. PR: Biol. 101, 102, 262 or equiv. and organic chem. The molecular and cellular basis of differentiation and morphogenesis.

364. **Advanced Plant Physiology.** I, II. 3 hr. PR: Biol. 169 or equiv., organic chem., gen. physics, and consent. Advanced studies of plant processes including recent advances in the field. I. Second Semester, odd-numbered years—Water relations and mineral nutrition and translocation. II. First Semester, odd-numbered years—Plant growth and development. III. Second Semester, even-numbered years—Environmental physiology.

366. **Plant Development.** II. 4 hr. PR: Biol. 102, organic chem. or biochem. Experimental studies of plant growth and development.

367. **Topics in Developmental Biology and Physiology.** I, II. S. 1-4 hr. PR: Consent. Topics in contemporary developmental biology and physiology. Topic will be selected by instructor for formal presentation.

368. **Problems in Developmental Biology and Physiology.** I, II, S. 1-4 hr. PR: Consent. Problems in contemporary developmental biology and physiology. Selection of problems to be determined in consultation with instructor.

369. **Seminar in Developmental Biology and Physiology.** I, II. 1 hr. Selected areas of developmental biology and physiology are presented and discussed.

390. **Seminar in Systematic and Evolutionary Biology.** I, II. 1 hr. Selected areas of systematic and evolutionary biology are presented and discussed.

391. **Topics in Systematics.** I, II, S. 1-4 hr. PR: Consent. Topics in contemporary systematics. Topic will be selected by instructor for formal presentation.

CHEMISTRY

Faculty

William R. Moore, Ph.D. (U. Minn.), *Chairman and Professor.*
William L. Clements, M.S. (WVU), *Instructor.*
Armand R. Collett, Ph.D. (Yale U.), *Professor Emeritus; Dean Emeritus, College of Arts and Sciences.*
Richard C. Dickinson, Ph.D. (U. Mo.), *Instructor.*
Gabor B. Fodor, Ph.D. (U. Szeged, Hungary), *Centennial Professor.*
John A. Gibson, Jr., Ph.D. (MIT), *Professor Emeritus.*
John Gruninger, Ph.D. (U. Penn.), *Assistant Professor.*
George A. Hall, Jr., Ph.D. (Ohio St. U.), *Associate Professor.*

James L. Hall, Ph.D. (U. Wisc.), *Professor.*
James B. Hickman, Ph.D. (Penn. St. U.), *Professor.*
George L. Humphrey, Ph.D. (Ore. St. U.), *Professor and Associate Chairman.*
Charles L. Lazzell, Ph.D. (Yale U.), *Professor Emeritus.*
A. Campbell Ling, Ph.D. (U. London), *Associate Professor.*
John P. Linsky, Ph.D. (Case-Western Reserve U.), *Instructor.*
C. Gordon McCarty, Ph.D. (U. Ill.), *Associate Professor.*
B. Jack McCormick, Ph.D. (Okla. St. U.), *Professor.*
Denis W. H. MacDowell, Ph.D. (MIT), *Professor.*
Joseph T. Maloy, Ph.D. (U. Tex.), *Assistant Professor.*
Chester W. Muth, Ph.D. (Ohio St. U.), *Professor.*
Ralph D. Nelson, Jr., Ph.D. (Princeton U.), *Assistant Professor.*
Jesse C. Patton, Ph.D. (WVU), *Instructor.*
Armine D. Paul, Ph.D. (U. Calif.), *Associate Professor.*
Cortlandt Pierpont, Ph.D. (Brown U.), *Assistant Professor.*
Peter Popovich, Ph.D. (Wash. St. U.), *Professor.*
John H. Strohl, Ph.D. (U. Wisc.), *Associate Professor.*
Vincent J. Traynelis, Ph.D. (Wayne St. U.), *Professor.*
Anthony Winston, Ph.D. (Duke U.), *Associate Professor.*
John C. Wright, Ph.D. (U. Ill.), *Dean, College of Arts and Sciences; Professor.*

Bachelor of Science in Chemistry

The Bachelor of Science degree is designed for those students who desire to qualify for professional positions in industry and governmental services as well as those who plan to do graduate work in chemistry. Requirements for the Bachelor of Science degree are listed below. Electives must be chosen so as to meet the basic requirements of the College of Arts and Sciences. A total of 136 hours is required, subject to the general course exclusions for all degrees. A second language, French or Russian, is recommended. Students wishing to pursue an honors program may include 4 to 6 hours of Chem. 194 as chemistry electives.

Admission to the program requires at least a 2.0 average in all courses in chemistry. Continuance in the program for the third and subsequent semesters requires a cumulative average of 2.0 for courses in chemistry taken in this department.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 17°	5	Chem. 18°	5	Chem. 133	3	Chem. 134	3
Math. 3	3	Math. 15	4	Chem. 135	1	Chem. 136	1
Math. 4	3	English 2	3	Physics 11	4	Physics 12	4
English 1	3	Phys. Ed. 2	1	German 1		German 2	
Phys. Ed. 1	1	Elective		(if necessary)	3	(if necessary)	3
Elective		(A and S)	3	Math. 16	4	Math. 17	4
(A and S)	3			Elective		Elective	
				(A and S)	3	(A and S)	3
	18		16		18		18

°Chem. 15, 16, and 115 will be required for those students not qualified for Chem. 17 and 18.

Third Year				Fourth Year	
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First and Second Sem.*	*Hr.*
Chem. 101	2	Chem. 144	3	Chem. 222	3
Chem. 143	3	Chem. 146	2	Chem. 242	3
Chem. 145	1	Chem. 210	3	Chem. Electives	9
Chem. 235	4	German 122	3	Electives	18
German 121	3	Elective (A and S)	3		
Elective (A and S)	3	Elective (A and S)	3		
	16		17		33

Required courses: 51 hr. of Chemistry courses, including Chem. 17 and 18 or 15, 16, and 115; Chem. 101, 133, 134, 135, 136, 143, 144, 145, 146, 210, 222, 235, 242; Math. 16, 17, and Physics 11, 12, or equiv.

Bachelor of Arts in Chemistry

The course requirements for the Bachelor of Arts degree with a major in chemistry are designed to meet the needs of those students who desire to go into careers which require a good background in the basic principles of chemistry. Areas such as medicine, dentistry, or other health-related sciences, secondary school teaching, or chemical laboratory technical work, may be pursued by proper choice of electives.

Admission to the program requires at least a 2.0 average in all courses in chemistry. Continuance in the program for the third and subsequent semesters requires a cumulative average of 2.0 for courses in chemistry taken in the department.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15*	4	Chem. 16*	4	Chem. 115*	4	Chem. 133	3
Calculus or Math. 3	3	Calculus or Math. 4	3	Physics 1	4	Chem. 135	1
English 1	3	English 2	3	Foreign Lang.	3	Physics 2	4
Biol. 1	4	Biol. 2	4	Electives**	6	Foreign Lang.	3
Phys. Ed. 1	1	Phys. Ed. 2	1			Electives**	6
Elective**	3	Elective**	3				
	18		18		17		17

Third Year				Fourth Year	
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First and Second Sem.*	*Hr.*
Chem. 134	3	Chem. 141	4	Chemistry electives***	8
Chem. 136	1	Foreign Lang. (if necessary)	3	Electives**	24
Foreign Lang. (if necessary)	3	Electives**	9-12		
Electives**	9-12				
	16		16		32

*Chem. 17 and 18 may be taken in lieu of Chem. 15, 16, and 115.

**Electives must be chosen to satisfy the Core Curriculum. Others may be chosen in the College of Agriculture and Forestry or the School of Medicine as well as in the College of Arts and Sciences.

***Upper-division courses in chemistry which may include biochemistry.

Honors Program

To be eligible for admission to the departmental Honors Program, a student must have a 3.5 average in chemistry courses taken at WVU, and must have the endorsement of the chemistry faculty.

A student may apply for initial admission to the program at any time after his first semester and no later than three semesters prior to graduation.

Application will be made to the departmental adviser who will serve as temporary adviser to the student.

A student re-entering the program, after having been out of it for a period of time, may in some cases be allowed to re-enter as late as his last semester in residence.

Laboratory Fees

A nonrefundable fee is required of all students who register for the following laboratory courses:

Course	*Per Semester*	*Course*	*Per Semester*
Chem. 11	$10.00	Chem. 145	$16.00
Chem. 12	10.00	Chem. 146	16.00
Chem. 15	10.00	Chem. 192	16.00
Chem. 16	10.00	Chem. 194	16.00
Chem. 17	12.00	Chem. 202	16.00
Chem. 18	12.00	Chem. 210	16.00
Chem. 115	12.00	Chem. 211	16.00
Chem. 131	12.00	Chem. 220	16.00
Chem. 135	16.00	Chem. 235	16.00
Chem. 136	16.00	Chem. 239	16.00
Chem. 141	12.00	Chem. 243	16.00

Note: A charge is made for excessive breakage in addition to the nonrefundable fee.

Courses of Instruction in Chemistry

Professors Moore (*Chairman*); Humphrey, (*Associate Chairman*); Fodor, J. L. Hall, Hickman, McCormick, MacDowell, Muth, Popovich, and Traynelis; Associate Professors G. A. Hall, Ling, McCarty, Paul, Strohl, and Winston; Assistant Professors Gruninger, Maloy, Nelson, and Pierpont; Instructors Clements, Dickinson, Linsky, and Patton.

Chem. 15 and 16 or Chem. 17 and 18 are prerequisite to all higher numbered courses in chemistry.

Lower Division

11. **Survey of Chemistry.** I. 4 hr. Part one of a course designed primarily for students who will not take more than one year of college chemistry. This course emphasizes the role and significance of chemistry in the modern world. Topics covered include: atomic structure; chemical bonding; acids, bases, and salts; periodicity; properties of gaseous, liquid, and solid states of matter; stoichiometry; oxidation-reduction. Not open to students in engineering. Two periods of lect., 1 period of rec., 3 hr. of lab. each week.

12. **Survey of Chemistry.** II. 4 hr. PR: Chem. 11. A continuation of Chem. 11. Topics covered include: nuclear chemistry; air and water pollution; useful materials from the earth, sea, and air; consumer chemistry; introduction to organic and biochemistry. Two periods of lect., 1 period of rec., 3 hr. of lab. each week.

15. **Fundamentals of Chemistry.** I, II. 4 hr. PR: English 1 and Math. 2 or equiv. or Conc. Designed for students who plan to take more than one year of college chemistry and for students in engineering. This course will seek to develop terminology, a working knowledge of the conceptual foundations and quantitative relationships on which subsequent courses in chemistry will be built. Two periods of lect., 1 period of rec., and 3 hr. of lab. each week.

16. **Fundamentals of Chemistry.** I, II. 4 hr. PR: Chem. 15. Continuation of Chem. 15. Two periods of lect., 1 period of rec., and 3 hr. of lab. each week.

17. **Principles of Chemistry.** I. 5 hr. PR: High school chemistry and Conc.: Math. 3, or more advanced mathematics. A more advanced treatment of the principles and theories of chemistry than offered in Chem. 15 and 16. Primarily for students specializing in chemistry and others desiring a more advanced treatment of general chemistry. Three periods of lect., 1 period of rec., 3 hr. of lab. each week.

18. **Principles of Chemistry.** II. 5 hr. PR: Chem. 17. A continuation of Chem. 17. Two periods of lect., 1 period of rec., and two 3-hr. lab. periods each week.

Upper Division

101. **Chemical Literature.** I. 2 hr. PR: Organic Chem. Study of techniques of locating, utilizing, and presenting information needed by the research worker in chemistry. Two periods of lecture each week.

115. **Introductory Analytical Chemistry.** I, II. 4 hr. PR: Chem. 16. Volumetric analysis, gravimetric analysis, solution equilibria, spectrophotometry, separations, and electrochemical methods of analysis. Two periods of lecture and two 3-hr. lab. each week.

131. **Organic Chemistry: Brief Course.** II. 4 hr. PR: Chem. 16. A one-semester course in organic chemistry with emphasis on biological applications for students in medical technology, agriculture, and home economics. Nomenclature, structure, reactivity, and stereochemistry are stressed. Three periods of lecture and one 3-hr. lab. each week.

133. **Organic Chemistry.** I, II. 3 hr. PR: Chem. 16 or 18 and 135 or concurrent enrollment. Basic principles of organic chemistry, including modern structural concepts, the effect of structure on physical and chemical properties, reactions and their mechanisms and application to syntheses. Three periods of lecture each week.

134. **Organic Chemistry.** I, II. 3 hr. PR: Chem. 133, 135, and 136 or concurrent enrollment. Continuation of Chem. 133. Three periods of lecture each week.

135. **Organic Chemistry Laboratory.** I, II. 1 hr. PR or Conc.: Chem. 133. Fundamental organic reactions and the preparation of organic compounds. One 3-hr. laboratory each week.

136. **Organic Chemistry Laboratory.** I, II. 1 hr. PR: Chem. 133, 134, and 135 or concurrent enrollment. Continuation of Chem. 135. One 3-hr. laboratory each week.

141. **Physical Chemistry: Brief Course.** I, II. 4 hr. PR: Chem. 16, Math. 4. A one-semester course in beginning physical chemistry covering the subjects of chemical thermodynamics, chemical dynamics, and the structure of matter. Three periods of lecture and one 3-hr. laboratory each week.

143. **Physical Chemistry.** I. 3 hr. PR: Chem. 18 or 115, Math. 16, and Physics 12. A first course in physical chemistry. Topics include a study of thermodynamics, and chemical equilibria. Three periods of lecture each week.

144. **Physical Chemistry.** II. 3 hr. PR: Chem. 143 and Math. 17. A continuation of Chem. 143. Chemical dynamics and the structure of matter. Three periods of lecture each week.

145. **Physical Chemistry Laboratory.** I. 1-2 hr. PR or Conc.: Chem. 143. Experimentation illustrating the principles of physical chemistry and offering experience with chemical instrumentation. One or two 3-hr. laboratories each week.

146. **Physical Chemistry Laboratory.** II. 1-2 hr. PR: Chem. 143, 144, 145 or concurrent enrollment. Continuation of Chem. 145. One or two 3-hr. laboratories each week.

192. **Undergraduate Research.** I, II. 1-3 hr. PR: Written consent of the instructor with at least a 2.0 overall grade-point average and a 3.0 grade-point average in chemistry courses. Individual investigations under supervision of an instructor. Three to nine hours of laboratory each week.

194. **Honors Course.** I, II. 1-3 hr. PR: Written consent and at least a 3.5 average in chemistry courses taken in the department. Research for students in the honors program. Thesis required.

202. **Selected Topics.** I, II. 1-3 hr. PR: Written consent of the instructor with at least a 2.0 grade-point average overall and a 2.0 grade-point average in chemistry courses. Individual instruction under supervision of an instructor.

210. **Instrumental Analysis.** II. 3 hr. PR: Chem. 143, 235. Basic instrumentation of analytical measurements. Electronics and instrument design. Methods of electrochemical and spectrochemical analysis. Two periods of lecture and one 3 hr. laboratory each week.

211. **Intermediate Analytical Chemistry.** I. 3 hr. PR: Physical Chem. 210. Basic concept of analytical procedures and separations at an advanced level. Two periods of lecture and one 3-hr. laboratory each week.

220. **Techniques of Chemical Syntheses.** II. 2 hr. PR or Conc.: Chem. 222. Modern techniques involved in the preparation and handling of inorganic and organic materials. Inert atmosphere, vacuum system, high temperature and pressure, fractional crystallization, distillation, sublimation, chromatography, separation of isomers, non-aqueous solvents, microscopy and other special techniques. Two 3-hr. laboratories each week.

222. **Chemistry of Inorganic Compounds.** II. 3 hr. PR: Chem. 242. A correlation of the reactions and properties of elements and their compounds based on modern theories of chemical bonding and structure. Topics include acid-base theory, non-aqueous solvents, ligand field theory and stereochemistry. Three periods of lecture each week.

235. **Methods of Structure Determination.** I. 4 hr. PR: Chem. 134 and 136. Both chemical and physical methods are used to study unknowns. Application of physical methods (u.v., ir., n.m.r., e.s.r., Raman and mass spectroscopy) to problems of organic chemistry with emphasis on structure elucidation. A practical course for students in chemistry and related fields who may need these methods in research and applied science. Two lectures and two 3-hour laboratories per week.

237. **Polymer Chemistry.** I or II. 3 hr. PR or Conc.: Chem. 143 or consent. The methods, mechanisms, and underlying theory of polymerization processes. The structure and stereochemistry of polymers in relation to chemical, physical, and mechanical properties. Lectures, 2-3 hours per week, accompanied by a laboratory designed to illustrate certain principles of polymerization processes and to demonstrate characteristic physical and chemical properties.

239. **Organic Syntheses.** II. 2 hr. PR: Chem. 136. Modern synthetic methods of organic chemistry. Two 3-hr. labs. each week.

242. **Chemical Bonding and Molecular Structure.** I. 3 hr. PR: Chem. 144, 210. An introduction to the quantum theory of chemical bonding. Atomic structure, theoretical spectroscopy, predictions of molecular structures and bond properties. Three periods of lecture each week.

243. **Introduction to Radiochemistry and Radiation Chemistry.** I. 3 hr. PR or Conc.: Physical Chem. An introduction to the basic fundamentals of radiochemistry and the use of tracer techniques in various disciplines, and an introduction to some aspects of radiation chemistry and how ionizing radiation interacts with matter. Two lectures and one 3-hr. laboratory each week.

244. **Colloid and Surface Chemistry.** II. 2 hr. PR: Physical Chem. Selected topics in the properties and physical chemistry of systems involving macromolecules, lyophobic colloids, and surfaces. Two periods of lecture each week.

245. **Crystallography.** I. 3 hr. PR or Conc.: Physical Chem. or consent. Applications of X-ray diffraction of crystals to the study of chemical and physical properties of matter. Includes theories of diffraction and crystallographic methods of analysis as applied to the study of molecular and crystal structures. Open to advanced students in chemistry, biochemistry, geology, physics and related fields. Three periods of lecture each week.

331. **Advanced Organic Chemistry I.** I. 3 hr. PR: Chem. 134. Structural concepts, localized and delocalized bonding, tautomerism, static and dynamic stereochemistry, mechanistic classifications of reagents, and reactions including some applications. Three periods of lecture each week.

332. **Advanced Organic Chemistry II.** II. 3 hr. PR: Chem. 331. A continuation of Chem. 331 with emphasis upon synthetic methods and reaction mechanisms, including carbonium ions, carbanions, and free radical chemistry. Three periods of lecture each week.

341. Chemical Thermodynamics. II. 3 hr. PR: Chem. 144. Principles of classical and statistical thermodynamics and their application to chemical problems. Three periods of lecture each week.

ECONOMICS

Faculty

Leo Fishman, Ph.D. (NYU), *Chairman and Professor.*
Vance Q. Alivis, Ph.D. (U. Va.), *Professor.*
Lee S. Balliet, M.A. (Kent St. U.), *Assistant Professor.*
Lewis C. Bell, Ph.D. (U. Ky.), *Professor.*
Robert D. Britt, Ph.D. (U. Colo.), *Associate Professor.*
Thomas C. Campbell, Jr., Ph.D. (U. Pitt.), *Professor.*
Edward K. Dix, Ph.D. (U. Md.), *Assistant Professor.*
George R. Dreese, Ph.D. (Ohio St. U.), *Associate Professor.*
Betty Fishman, M.S. (NYU), *Associate Professor.*
Richard W. Humphreys, M.A. (U. Wisc.), *Assistant Professor.*
Parviz Jenab, M.A. (Ind. U.), *Instructor.*
Dennis R. Leyden, B.S. (Clemson U.), *Assistant Professor.*
Charles R. McKnew, Ph.D. (VPI), *Assistant Professor.*
Patrick C. Mann, Ph.D. (Ind. U.), *Associate Professor.*
William H. Miernyk, Ph.D. (Harvard U.), *Professor.*
Catherine A. Palomba, Ph.D. (Iowa St. U.), *Assistant Professor.*
Neil A. Palomba, Ph.D. (U. Minn.), *Associate Professor.*
Suzanne E. Reid, M.A. (Duke U.), *Assistant Professor.*
Kenneth L. Shellhammer, Ph.D. (U. Colo.), *Assistant Professor.*
Wil J. Smith, M.S. (U. Wisc.), *Assistant Professor.*
Owen A. Tapper, M.S. (U. Wisc.), *Assistant Professor.*
James H. Thompson, Ph.D. (U. Pitt.), *Professor.*
Royce J. Watts, M.S. (WVU), *Assistant Professor.*
Tom S. Witt, M.A. (Wash. U.), *Assistant Professor.*
Gregory J. L. Yi, Ph.D. (U. Buffalo), *Assistant Professor.*
Fred A. Zeller, Ph.D. (Ohio St. U.), *Associate Professor.*

Programs

The College of Business and Economics offers all courses in economics, but these are recognized as a regular part of the program of the College of Arts and Sciences. The College of Business and Economics grants the degree of Bachelor of Science in Economics (B.S.Ec.), while the College of Arts and Sciences grants the A.B. degree with a major in Economics.

The course leading to the B.S.Ec. degree is aimed primarily at preparing the student for a career as an economist in business or government. Consequently, the student selecting this program is required to complete courses in business administration as well as courses in economics. About one-half of his upper-division electives must be taken in courses offered by the College of Business and Economics.

The program leading to the A.B. degree is designed for students who wish to combine fundamental training in economics with a liberal arts education. The Core Curriculum requirements must be met in the choice of electives. Of the total 128 hours required for graduation, some 40 or more credit hours are available for elective subjects.

Requirements for Majors

Hours. Undergraduate majors in economics must complete a minimum of 27 upper-division hours in Economics, including the required courses listed below. In addition, students must complete 9 upper-division hours in a minor field approved by their advisers.

Distribution of Courses. Majors are required to take at least one course (3 hr.) from three of the four areas of concentration listed below.

Concentration of Courses. Majors are required to take at least three courses (9 hr.) in one area of concentration.

Required Courses–Non-economics. History 1 and 2 or Humanities 1 and 2; History 52 and 53 or Political Science 2 and 120; Math. 3 and 28; Speech Com. 11.

Required Courses–Economics. Econ. 51, 52, 125, 211, 212, 216.

Areas of Concentration

Majors are required to take three courses (nine credit hours) from one of the areas of concentration listed below. Majors also are required to take at least one course (3 hr.) in two areas other than the major area of concentration.

1. Quantitative Analysis[1]
   Econ. 220, 226, 200[2]
2. Public Sector and Private Enterprise
   Econ. 130, 241, 245, 246, 200[2]
3. Human Resources
   Econ. 160, 261, 262, 263, 265, 200[2]
4. Regional, International, and Development
   Econ. 210, 213, 250, 255, 270, 200[2]

[1]Students wishing to concentrate in quantitative analysis may supplement the area with courses approved by their advisers in mathematics and/or statistics. Students must still take a minimum of 27 upper-division hours in economics.

[2]In order for Econ. 200 (Special Topics) courses to satisfy concentration and distribution requirements, the courses must be selected from the relevant areas of concentration.

SUGGESTED SCHEDULE OF COURSES

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Math. 28	3	Econ. 125	3
Econ. 51	3	Econ. 52	3	Hist. 52 or		Hist. 52 or	
Hist. 1 or		Hist. 2 or		Pol. Sci. 2	3	Pol. Sci. 120	3
Hum. 1	3	Hum. 2	3	Foreign Lang.		Foreign Lang.	
Foreign Lang.	3	Foreign Lang.	3	(if necessary)	3	(if necessary)	3
Speech Com. 11	3	Math. 3	3	Core C		Core C	
Phys. Ed.	1	Phys. Ed.	1	(Lab. Sci.)	3-4	(Lab. Sci.)	3-4
				Core A	3	Core A	
						(if necessary)	3-6
	16		16		15-16		15-19

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Econ. 211	3	Econ. 212	3	Electives, Econ.	3-6	Electives, Econ.	3-6
Electives, Econ.	3-6	Econ. 216	3	Electives, Minor	3	Electives, Minor	3
Electives	6-9	Electives, Econ.	3	Electives	6-9	Electives	6-9
		Electives, Minor	3				
		Electives	3-6				
	15-18		15-18		15-18		15-18

Courses of Instruction in Economics

Professors L. Fishman (*Chairman*), Alvis, Bell, Campbell, Miernyk, and Thompson; Associate Professors Britt, Dreese, B. Fishman, Humphreys, Mann, N. Palomba, and Zeller; Assistant Professors Balliet, Dix, Leyden, McKnew C. Palomba, Reid, Shellhammer, Smith, Tapper, Watts, Witt, and Yi; Instructor Jenab.

Econ.

Lower Division

51. **Principles of Economics.** I, II. 3 hr. Principles of resource allocation, income, output and price determination under different competitive conditions; money, banking, and monetary policy; national income, unemployment, and fiscal policy; taxation and government spending; international economics, underdeveloped areas, and comparative economic systems.

52. **Principles of Economics.** I, II. 3 hr. PR: Econ. 51. Continuation of Econ. 51.

Upper Division

Economics 51 and 52 are prerequisites to all upper-division courses in economics.

125. **Statistics.** I, II. 3 hr. PR: Math. 3, 8. Basic statistical methods employed in collection, presentation, analysis, and interpretation of business and economic data, such as analysis of frequency distribution, times series, inference, index numbers, and correlation.

130. **Money and Banking.** I, II. 3 hr. Our system of monetary and banking arrangements, viewed in relation to functioning of the economic system as a whole.

160. **Labor Economics.** I, II. 3 hr. Introduction to labor economics and labor relations in industry, including the interaction of economic forces, union policies, personnel practices, and labor law.

200. **Special Topics.** I, II, S. 1-4 hr. PR: Econ. 51, 52, or consent. Study of special topics relevant to economics. Maximum of 9 semester hours in any or all courses numbered 200 offered by this college may be applied toward the bachelor's and master's degrees.

205. **Current Economic Problems.** S. 3 hr. PR: Econ. 51, 52, or consent. For students in education only. A course designed to acquaint public school teachers with reliable source material in economics and to instruct them in studying current economic problems.

210. **Comparative Economic Systems.** I or II. 3 hr. Structure and processes of existing economic systems throughout the world including review of basic principles of free enterprise, socialistic, communistic, and fascistic societies. Comprehensive analysis based on current and recent experiments in these economies.

211. **Micro Economic Analysis.** I. 3 hr. A study of price and output determination and resource allocation in the firm under various competitive conditions.

212. **Macro Economic Analysis.** II. 3 hr. Analysis of the forces which determine the level of income, employment, and output. Particular attention to consumer behavior, investment determination, and government fiscal policy.

213. **Economic Development.** I or II. 3 hr. Comprehensive study of the problems, changes, and principal policy issues faced by non-industrialized countries in the process of economic development.

216. **History of Economic Thought.** I or II. 3 hr. Economic ideas in perspective of historic development.

220. **Introduction to Quantitative Analysis.** I or II. 3 hr PR: Econ. 125. Study of the principal mathematical techniques employed in economic analysis; an introduction to econometrics.

226. **Advanced Statistics.** II. 3 hr. PR: Econ. 125 or equiv. Advanced approach to statistical analysis with emphasis on probability, inference, and multivaried statistical techniques.

241. **Public Finance.** I, II. 3 hr. Governmental fiscal organizations and policy; taxes and tax systems with emphasis on the federal government and the State of West Virginia.

245. **Government and Business.** I or II. 3 hr. Government in its role of adviser and umpire; analysis of governmental policies and practices affecting business.

246. **Transportation.** I, II. 3 hr. Development of an inland transportation system and relations and policies of transport agencies.

250. **International Economics.** I or II. 3 hr. Development of trade among nations; theories of trade; policies, physical factors, trends, and barriers in international economics.

255. **Regional Economics.** I or II. 3 hr. Analysis of the factors that promote or deter the economic growth of a region, with emphasis on such matters as population shifts, economic base studies, industrial location analyses, input-output techniques, regional income estimation, local multiplier and cycle concepts, and the role of government in regional growth.

261. **Trade Unionism.** I or II. 3 hr. PR: Econ. 160 or consent. Analysis of the structure, government, attitudes, and policies of organized labor; implications of union policy.

262. **Collective Bargaining.** I or II. 3 hr. PR: Econ. 160 or consent. Theory and practice of collective bargaining; including contract issues, types of relationships, and the role of government policy.

263. **Economics of Wages.** I or II. 3 hr. PR: Econ. 160 or consent. Determination of wage levels and structure; functioning and organization of labor markets.

265. **Economics of Social Security.** I or II. 3 hr. PR: Econ. 51, 52, or consent. An examination and analysis of social and political efforts to provide economic security, including an examination of the parallel developments of private insurance.

270. **Growth of the American Economy.** I or II. 3 hr. Central issues in the development of the American economy.

299. **Readings in Economics.** I, II, S. 1-3 hr. Students will develop and carry out a program of specialized readings under the supervision of a cooperating instructor.

ENGLISH LANGUAGE AND LITERATURE

Faculty

Ruel E. Foster, Ph.D. (Vanderbilt U.), *Chairman and Professor.*
Rudolph Almasy, M.A. (U. Minn.), *Instructor.*
Joy U. Berkley, M.A. (WVU), *Assistant Professor.*
Sophia B. Blaydes, Ph.D. (Ind. U.), *Associate Professor.*
Philip Bordinat, Ph.D. (U. Birmingham, England), *Professor.*
Frances B. Boyd, M.A. (WVU), *Instructor.*
George R. Bramer, Ph.D. (U. Notre Dame), *Associate Professor and Coordinator of Writing Programs.*
J. P. Brawner, Ph.D. (U. Ill.), *Professor Emeritus.*
Arthur C. Buck, M.A. (U. Penn.), *Assistant Professor.*
Mary C. Buswell, M.A. (WVU), *Associate Professor.*
Susan Carey, M.A. (WVU), *Instructor.*
Robert W. Clarke, Ph.D. (U. Wisc.), *Associate Professor.*
Mary Lou Clarkson, M.A. (WVU), *Instructor.*
Lloyd M. Davis, M.A. (Vanderbilt U.), *Assistant Professor.*
Oreta H. Dawson, M.A. (WVU), *Assistant Professor.*
Edna M. Dillon, M.A. (WVU), *Instructor.*
David W. Dowdell, M.A. (WVU), *Assistant Professor.*
John W. Draper, Ph.D. (Harvard U.), *Professor Emeritus.*
James Dugger, M.A. (U. Iowa), *Instructor.*
Richard B. Eaton, Jr., Ph.D. (U. N.C.), *Associate Professor.*
Nicholas G. Ehle, Jr., M.A. (WVU), *Instructor.*
Nicholas G. Evans, M.A. (WVU), *Instructor.*
William P. Fitzpatrick, M.A. (U. Md.), *Assistant Professor.*
Thomas J. Floyd, M.A. (U. Md.), *Instructor.*
John Flynn, M.A. (WVU), *Instructor.*
William W. French, Ph.D. (U. Pitt.), *Associate Professor.*
Winston E. Fuller, M.A. (U. Colo.), *Assistant Professor.*
Jack W. Futrell, M.A. (Columbia U.), *Assistant Professor.*
Patrick W. Gainer, Ph.D. (St. Louis U.), *Professor Emeritus.*
Avery F. Gaskins, Ph.D. (Ind. U.), *Associate Professor.*
Kathleen Geissler, M.A. (U. Iowa), *Instructor.*
Elaine K. Ginsberg, Ph.D. (U. Okla.), *Assistant Professor.*
Thora M. Golz, M.A. (NYU), *Instructor (part-time).*
W. Michael Grant, Ph.D. (Brown U.), *Associate Professor.*
Carolyn H. Hampson, M.A. (WVU), *Instructor.*
John L. Hicks, Jr., M.A. (Ind. U.), *Associate Professor.*
Betsy Hobbs, M.S. (WVU), *Instructor.*
Martha C. Howard, M.A. (U. Mich.), *Associate Professor.*
Doris J. Huzzey, M.A. (WVU), *Assistant Professor.*
Betty Jo Hypes, M.A. (WVU), *Instructor.*
Iris M. Jennings, M.A. (WVU), *Instructor.*

John H. Johnston, Ph.D. (U. Wisc.), *Professor.*
Terry Lucas, M.A. (WVU), *Instructor.*
Russell C. MacDonald, Ph.D. (U. Penn.), *Associate Professor.*
Elizabeth Madison, M.A. (Purdue U.), *Instructor.*
Yvonne J. Milspaw, M.A. (Ind. U.), *Instructor.*
Jean Moss, Ph.D. (WVU), *Instructor.*
Byron C. Nelson, M.A. (U. Ill.), *Instructor.*
Carolyn Nelson, Ph.D. (U. Wisc.), *Instructor.*
M. Nadine Page, M.A. (U. Chicago), *Associate Professor Emeritus.*
Virgil L. Peterson, Ph.D. (UCLA), *Associate Professor.*
John Racin, Jr., Ph.D. (Ohio St. U.), *Associate Professor.*
Elizabeth F. Reed, M.A. (Columbia U.), *Assistant Professor Emeritus.*
Kathleen G. Rousseau, M.A. (WVU), *Instructor.*
Frank Scafella, Jr., Ph.D. (U. Chicago), *Assistant Professor.*
Renata Schmidt, M.A. (U. Mich.), *Instructor.*
Dorothy Sedley, M.A. (Sonoma St. C.), *Instructor.*
Aileen K. Shafer, M.A. (WVU), *Instructor.*
Thomas S. Sloane, M.A. (WVU), *Instructor.*
Fred Manning Smith, Ph.D. (Cornell U.), *Professor Emeritus.*
Elizabeth C. Spindler, M.A. (WVU), *Assistant Professor.*
John F. Stasny, M.A. (Marquette U.), *Associate Professor.*
Judith G. Stitzel, Ph.D. (U. Minn.), *Associate Professor.*
Hayden Ward, Ph.D. (Columbia U.), *Assistant Professor.*
Anne T. Weisser, M.A. (WVU), *Instructor (part-time).*
Jack Welch, M.F.A. (U. Iowa), *Associate Professor.*

English Major

An English major must complete a minimum of 33 hours in English literature and composition exclusive of English 1 and 2.

In the lower division, a student who expects to major in English should take the first semester of the survey of English literature (English 21), the first semester of the survey of American literature (English 24), and one course from the following: English 22, 25, 35, 36. An upper-division student may substitute English 121 for 21, 122 for 22, 135 for 35, and 136 for 36. These courses, however, are not absolute prerequisites to entrance into the program of major studies in English. If a student who is accepted as a major has not had the lower-division survey courses, he will be expected to compensate for the deficiency by taking certain upper-division courses that will be suggested by the departmental adviser.

Advisers of upper-division students who are not English majors may schedule them for English courses in the 100 and 200 series without regard to prerequisites. Students enrolling in 200 courses, however, will have special difficulty if they have not had prior work in literature courses.

The upper-division courses named below are minimal. An English major may have a maximum of 42 hours in English, exclusive of English 1 and 2, within the 128 hours required for graduation.

A. *Language*—English majors must choose at least one course from: English 111, 112, 113, 210, 211, 310.

B. *American Literature*—English majors must choose at least one upper-division course from: English 131, 220, 230, 235, 266, 280, 283, 286, 340, 341, 369, 370, 371, 372.

C. *British Literature*—English majors must choose at least two upper-division courses from: English 150, 250, 251, 255, 256, 261, 262, 263, 264, 331, 332, 335, 350.

D. *Additional elective courses* in English composition, language, and literature, for a total of at least 33 hours and not more than 42 hours. The student can concentrate on either English or American literature and he can take courses in creative writing.

English majors must elect acceptable courses for a grand total of 128 semester hours. In the College of Arts and Sciences, courses in history, humanities, foreign languages, and speech communication are among those recommended. A student may establish credit for a limited number of hours in other colleges of the University. Available courses in drama, art, music, and journalism are among those recommended.

Honors Program

At the beginning of the second semester of his junior year, an English major who has achieved an overall grade-point average of 3.0 or better, and whose record in English studies is above 3.0, may apply for admission to the Honors Program of the Department.

SUGGESTED SEMESTER PROGRAMS

(Not for Teacher Trainees)

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	English 21 or 24	3	Foreign Lang.	3
English 21 or 24	3	English 22, 25,		Foreign Lang.	3	Core C	3-4
Foreign Lang.	3	35, or 36	3	Core C	3-4	Core B	3
Science		Foreign Lang.	3	Core B	3	English	3
(Core C)	3-4	Science		Core A	3	Elective	3
Core Group B	3	(Core C)	3-4				
Phys. Ed.	1	Core Group B	3				
		Phys. Ed.	1				
	16-17		16-17		15-16		15-16

Third and Fourth Years

The student will complete courses from A, B, and C shown above; additional English courses to make a minimum of 33 hours; and electives necessary to complete the required hours for the A.B. degree.

Teacher Certification for English Majors

Through careful planning, a student may within four years combine studies leading to the A.B. degree in the College of Arts and Sciences with a major in English and certification for teaching English in the secondary schools. Students interested in this combination should call at the English office for a special mimeographed summary of the requirements for teacher certification as correlated with the requirements of the College of Arts and Sciences and the Department of English.

Lower-division students preparing for certification as English teachers, with the A.B. degree in English, should be especially careful to enroll for a foreign language in addition to courses in the general-education program for teacher trainees.

In order to complete the *English major* and requirements for teacher certification in four years, the student should choose the Language Arts (comprehensive) teaching field. Otherwise, he will have to complete the English teaching field and one other field. If the student wishes to attend summer school, or to take an extra semester, he may qualify in two fields: English and one other. For requirements in various fields, see the bulletin on teacher certification programs.

Lower-division students preparing for teacher certification should take English 21, 22, 24, and 25.

SUGGESTED SEMESTER PROGRAMS

(Four-Year Course for Teachers Trainees in Language Arts)

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3
Foreign Lang.	3	Foreign Lang.	3
Hist. 1	3	Hist. 2	3
Biol. 1 or Phys. Sci. 1	4	Biol. 2 or Phys. Sci. 2	4
English 21	3	English 22	3
Phys. Ed. 1	1	Phys. Ed. 2	1
	17		17

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 24	3	English 25	3
Art 30	3	Music 30	3
Math. 21	2	Math. 22	2
Speech Com. 34	3	Drama 50	3
Foreign Lang. (if necessary)	3	Foreign Lang. (if necessary)	3
Soc. Sci. 1	3	Soc. Sci. 2	3
		Health Ed. 102	2
	17		19

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 150	3	English 111	3
English 125 or 236	3	English 263, 264, 265, 267	3
Drama 75	3	English 131, 220, 235, 266, 288	3
Journ. 18	3	Drama 180	3
C&I	2	Ed. Psych. 106	3
Ed. Psych. 105	3		
	17		15

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 251, 255, 261, 262	3	C&I 104	4
Journ. 125	3	C&I 188	6
C&I 280	3	C&I 287	2
English Electives	3		
Speech Com. 121	3		
	15		12

The student may re-arrange the course patterns in order to do his student teaching during the First Semester of the senior year.

Courses of Instruction in English Language and Literature

Professors Foster (*Chairman*), Bordinat, and Johnston; Associate Professors Blaydes, Bramer, Buswell, Clarke, Eaton, French, Gaskins, Grant, Hicks, Howard, MacDonald, Peterson, Racin, Stasny, Stitzel, and Welch; Assistant Professors Berkley, Buck, Davis, Dawson, Dowdell, Fitzpatrick, Fuller, Futrell, Ginsberg, Huzzey, Scafella, Spindler, and Ward; Instructors Almasy, Boyd, Carey, Clarkson, Dillon, Dugger, Ehle, Evans, Floyd, Flynn, Geissler, Golz (part-time), Hampson, Hobbs, Hypes, Jennings, Lucas, Madison, Milspaw, Moss, B. Nelson, C. Nelson, Rousseau, Schmidt, Sedley, Shafer, Sloane, and Weisser (part-time).

English

Lower Division

1. **Composition and Rhetoric.** I, II. 3 hr. Required of all candidates for the bachelor's degree in all colleges except for certain students of superior achievement who may be exempted from the requirement under regulations prevailing at the time of admission.

2. **Composition and Rhetoric.** I, II. 3 hr. Required of all candidates for the bachelor's degree in all colleges unless the requirement for certain students of superior achievement is waived under regulations announced for the year of admission.

8. **Intermediate Composition.** I, II. 3 hr. PR: English 1 and 2. Composition for students who wish to develop skills in solving problems of written communication relevant to their career objectives.

21. **Survey: English Literature.** I, II. 3 hr. English authors from Beowulf to Burns and readings from their works. Upperclassmen may substitute English 121 for this course. Students may not receive credit for both English 21 and English 121.

22. **Survey: English Literature.** I, II. 3 hr. English authors from Robert Burns to the present and readings from their works. Upperclassmen may substitute English 122 for this course. Students may not receive credit for both English 22 and English 122.

24. **American Literature.** I, II. 3 hr. American authors to 1870 with readings from their works.

25. **American Literature.** I, II. 3 hr. Continuation of English 24. American poetry and prose from 1870 to the present.

35. **Types of Literature.** I, II. 3 hr. Selected works of English, American and European authors, read for appreciation and enjoyment. Poetry and drama emphasized. Designed particularly to satisfy Core Curriculum requirements. Upperclassmen may substitute English 135 for English 35. Students may not receive credit for both English 35 and English 135.

36. **Types of Literature.** I, II. 3 hr. Continuation of English 35. Emphasis on examples of prose fiction by English, American, and European writers. May be taken independently of English 35. Upperclassmen may substitute English 136 for English 36. Students may not receive credit for both English 36 and English 136.

80. **Literature of Black America.** I. 3 hr. A survey course in Black American literature from its inception to the present.

Upper Division

101. **Creative Writing: Narration (Short Story).** I, II. 3 hr. Purpose and pattern of the modern stort story; study of examples in the current periodicals; special assignments and conferences with individual students on a minimum number of short stories.

102. **Creative Writing. Workshop.** I, II. 3 hr. A workshop course for students, competent in composition, who wish to explore their interests in writing fiction. Emphasis on techniques and analyzing the students' own works.

103. **Creative Writing.** I, II. 3 hr. Practice in basic techniques of writing poetry. Possibilities and limitations of the poetic genre. Primary emphasis on image, metaphor, and development by association.

108. **Advanced Composition.** I, II. 3 hr. PR: English 1 and 2. Composition for advanced students who wish to further develop their expository writing skills.

111. **The English Language.** I, II. 3 hr. Structure of the English language. Linguistic study designed especially for English teachers in secondary schools. Required of all teacher trainees preparing for certification in English or Language Arts.

112. **Words and Usage.** II. 3 hr. Practical vocabulary building, English grammar and usage. Attention to the derivation, history, and meaning of words, and to the principles of syntax and grammar.

113. **American English.** II. 3 hr. Historical survey of the development of American English from the time of colonization to the present, with particular attention to social, cultural, economic, and political forces that have influenced the development of American English and with special emphasis on regional variations, particularly the Appalachian dialect.

121. **English Literature.** I, II. 3 hr. Survey of English literature from the beginning to 1800. May be substituted for English 21 but may not be elected by students who already have credit for English 21.

122. **English Literature.** I, II. 3 hr. Continuation of English 121 from 1800 to present. May be substituted for English 22 but may not be elected by students who already have credit for English 22.

125. **World Literature.** I, II. 3 hr. Selected readings in the works of authors of world literature both ancient and modern.

131. **American Fiction.** I, II. 3 hr. The reading of ten or more of the most important American novels from Hawthorne to the present day, each considered as a work of art reflecting a significant view of life. Lectures on the works of principal authors, with class discussion of particular books.

132. **Poetry.** I, II. 3 hr. Appreciation and enjoyment of poems through critical and analytical reading. Studies in the various types of poetry, and of the language, imagery, and techniques of poetic expression.

133. **The Short Story.** II. 3 hr. Study of the short story's structure, history, and contemporary forms.

135. **Introduction to Literature (Part I).** I, II. 3 hr. Poetry and drama, read for understanding and enjoyment. A Core Curriculum course comparable to English 35, for upper-division students. May not be taken in addition to English 35.

136. **Introduction to Literature (Part II).** I, II. 3 hr. A Core Curriculum course comparable to English 36. Prose fiction: stories and novels. For upper-division students. May not be taken in addition to English 36.

140. **Introduction to Folklore.** I, II, S. 3 hr. A general view of folklore, both in its theoretical and functional aspects. Emphasis on recognition, collection, and documentation of collected materials.

141. **American Folklore and Culture.** I, II, S. 3 hr. PR: English 140 or consent. Sampling of various aspects of folklore from the American Indian, early settlers, the American Negro, the immigrant, and occupational groups. The influence of folklore on contemporary developments in American culture.

150. **Shakespeare.** I, II. 3 hr. Twelve of Shakespeare's most important plays.

161. **Elizabethan Poetry and Prose.** I. 3 hr. The Renaissance in England as manifested in the great variety of nondramatic literary works of the sixteenth century, with emphasis on the major writers of the reign of Elizabeth I.

162. **Literature of the Seventeenth Century.** II. 3 hr. Major poets and prose writers of the seventeenth century, with the exception of dramatic writings.

163. **English Literature, 1660-1744.** I. 3 hr. Literature from the Restoration to the death of Pope, exclusive of the drama.

164. **English Literature, 1774-1798.** II. 3 hr. Literature from the death of Pope to the publication of Wordsworth's *Lyrical Ballads,* exclusive of the drama.

170. **Contemporary Literature.** I. 3 hr. Modern British and American poets and prose writers—including novelists, short-story writers, dramatists, and essayists. Chronology is roughly from 1900 to 1925.

171. **Contemporary Literature.** II. 3 hr. Continuation of English 170 from approximately 1925 to the present time.

180. **Bible Literature: Old Testament.** I. 3 hr. Various types of literature exemplified in the Old Testament, read for their intrinsic merit and for their historical and cultural significance. Continued in English 181.

181. **Bible Literature: New Testament and Apocrypha.** II. 3 hr. Contents of the New Testament, its literary quality, with consideration of its historical relations and of the relationships of the several writers represented. Because of the difficulty of treating the wealth of materials of the Old Testament during the one semester of English 180, the first part of this course will be devoted to continuation of the study of certain books of the Old Testament.

185. **An Introduction to Contemporary African Literature.** II. 3 hr. Survey course including contemporary African poetry, drama, and fiction.

197. **Honors Course.** I, II. 3 hr. Independent reading and study. For students admitted to the Honors Program in the Second Semester of their junior year.

198. **Honors Course.** I, II. 3 hr. For the First Semester of the senior year of students admitted to the Honors Program.

199. **Honors Course.** I, II. 3 hr. For students in the Honors Program; final semester of senior year.

201. **Creative Writing.** II. 3 hr. PR: English 101, 102 or 103, or their equiv., or consent. An advanced workshop in creative writing for students who are seriously engaged in the writing of a major work.

210. **Structure of the English Language.** I, II. 3 hr. Historical, comparative, and descriptive grammar, together with an introduction to English linguistics.

211. **History of the English Language.** I. 3 hr. Study of the nature of the language; questions of origins, language families, development, relationships of English as one of the Indo-European languages.

220. **American Poetry.** I. 3 hr. Study of major American poets of the nineteenth and twentieth centuries—Bryant, Poe, Emerson, Longfellow, Whitman, Dickinson, Frost, Eliot. Primary emphasis on their poetry as poetry; background materials minimized.

230. **Modern American Biography.** I. 3 hr. A selection of the most significant and interesting biographies and autobiographies of Americans of distinction in literature, the arts, and public life.

231. **Modern British Biography.** II. 3 hr. Representative biographies and autobiographies of important British figures in public life and the arts, chosen for their literary value and their interest and relevance in contemporary life.

232. **Literary Criticism.** II. 3 hr. The history of literary criticism from Aristotle to modern times.

233. **Recent Literary Criticism.** I, II. 3 hr. Brief survey of the theories and essays of five major schools of modern criticism and an application of these theories to a novel, to a play, and to selected poems and short stories.

234. **Modern Drama.** I. 3 hr. Study of world drama from Ibsen to the present day.

235. **American Drama.** I. 3 hr. Study of representative American dramas and of the history of the theatre in America.

236. **Tragedy.** II. 3 hr. Masterpieces of tragedy from Greek times to modern, with consideration of the changing concepts of tragedy and of the ethical and ideological values reflected in the works of major tragic authors.

240. **Folk Literature.** I. 3 hr. Study of the folk ballad, its origin, history, and literary significance, based on Child's collection and on American ballad collections.

241. **Folk Literature of the Southern Appalachian Region.** II. 3 hr. Study of the traditional literature of the southern Appalachian region, including songs, prose, tales, languages, customs, based on material collected in the region, especially in West Virginia.

250. **Shakespearean Comedies and History Plays.** I. 3 hr. Study of representative comedies of Shakespeare against the background of classical and Renaissance theory and practice, and of selected history plays.

251. **Shakespearean Tragedy.** II. 3 hr. Study of the principal tragedies of Shakespeare, together with the history of criticism, scholarly investigation, and interpretation.

255. **Chaucer.** I. 3 hr. Early poems, *Troilus and Criseyde*, and *The Canterbury Tales*. In addition to an understanding and appreciation of Chaucer's works, the student is expected to acquire an adequate knowledge of Chaucer's language.

256. **Milton.** II. 3 hr. Study of all of Milton's poems and a few selected prose works.

261. **Sixteenth Century Prose and Poetry.** I. 3 hr. Studies from Caxton to Bacon, from Skelton to Shakespeare.

262. **Seventeenth Century Prose and Poetry.** II. 3 hr. Studies from Donne to Dryden.

263. **Literature of the Eighteenth Century.** I. 3 hr. Literature of the period 1700-1759, studied in relation to the social, political, and religious movements of the time.

264. **Literature of the Eighteenth Century.** II. 3 hr. Continuation of English 263, covering the latter half of the century. May be taken independently of English 263.

265. **The Romantic Movement.** I. 3 hr. The works of Wordsworth, Coleridge, and Keats, together with an introduction to works of scholarship in English Romanticism.

266. **American Romanticism.** II. 3 hr. The writings of Ralph Waldo Emerson, Henry David Thoreau, and Nathaniel Hawthorne. A study of the relations of these men to the history of their own time, and of their contributions to American thought and art.

267. **Victorian Poetry.** I. 3 hr. Study of the major Victorian poets—Tennyson, Browning, Arnold, Rossetti, Morris, Swinburne, Fitzgerald, and a few of the later Victorian poets.

268. **Modern British Poetry.** I. 3 hr. Survey of British poetry from 1880 to the present, including the Decadents, Counter-Decadents, Hopkins, Housman, Hardy, the Georgians, the Imagists, World War I poets, Yeats, Eliot, the Auden Group, and post-World War II poets.

280. **Southern Writers.** II. 3 hr. Examination of twentieth-century Southern essayists, poets, short-story writers, and novelists in relation to the ideological background.

281. **Literature for Teachers.** S. 3 hr. Study and appreciation of selected works of American authors, with special reference to the high school curriculum.

282. **Literature for Teachers.** S. 3 hr. Study and appreciation of selected works of English authors. Recommended for teachers of high school curriculum.

283. **Study of Selected Authors (American).** I, II. 3 hr. Study of the works of a principal American author, or more than one, as announced when the course is scheduled.

284. **Study of Selected Authors (English).** I, II. 3 hr. Study of the works of one or more of the principal English authors, as announced in the schedule when the course is listed.

286. **Black American Fiction.** II. 3 hr. Survey of novels and short stories written by black Americans from 1890 to the present.

310. **Old English (I).** I. 3 hr. Study of Anglo-Saxon with selected readings from the literature of the period.

311. **Old English (II).** II. 3 hr. PR: English 310. *Beowulf* and other texts in Old English.

312. **Approaches to Teaching Composition.** S. 3 hr. PR: English 1, 2. Survey of the attitudes toward and techniques of teaching writing in elementary and secondary schools. In addition, there are frequent opportunities for students to write, to analyze their writing, and to experiment in class with various methods of teaching writing to children and young adults. Special attention to formulating writing assignments and to devising effective methods of evaluation and grading.

330. **Early English Drama.** I. 3 hr. Study of the medieval and early Tudor drama to the age of Shakespeare.

331. **Elizabethan Drama.** II. 3 hr. Study of the dramas of Shakespeare's contemporaries and successors to the closing of the theatres in 1642. Includes Kyd, Marlowe, Peele, Greene, Johnson, Heywood, Marston, Chapman, Webster, Beaumont and Fletcher, Massinger, Ford, and Shirley.

332. **Restoration and Eighteenth Century Drama.** II. 3 hr. Comedy, tragedy, the heroic play, the drama of sensibility and the reaction against it: Etherege, Wycherley, Farquhar, Congreve, Vanbrugh, Dryden, Otway, Goldsmith, and Sheridan.

334. **Contemporary Drama.** II. 3 hr. Recent developments in the drama, with special attention to Miller, Williams, Sartre, Anouilh, Osborne, Pinter, Bolt, and the Absurdists. (The content of this course will be altered as new playwrights representing new developments come into prominence.)

335. **The English Novel to the Time of Scott.** I. 3 hr. Study of the English novel from the sixteenth century to the time of Scott, showing the development of the novelistic art from early narrative beginnings.

336. **The English Novel, 1832-1900.** II. 3 hr. Continuation of English 335. The development of the English novel from the early nineteenth century to the beginning of the twentieth century.

337. **The Modern Novel.** I. 3 hr. The twentieth-century novel, with emphasis upon the works of selected British novelists.

340. **The American Novel to 1915.** I. 3 hr. History of the American novel, based on the reading of ten or twelve novels, from the beginning to World War I.

341. **The American Novel, II.** II. 3 hr. History of the American novel, based on readings of ten to twelve novels from World War I to the present.

350. **Shakespeare.** I. 3 hr. Intensive study of selected plays. Special attention to textual problems and to language and poetic imagery, together with the history of Shakespearean criticism and scholarship.

355. **Spenser.** I. 3 hr. A study of Spenser's poetry, minor poems, and *The Faerie Queene*, forms and sources, purpose of the great epic, social, political, and religious allegory.

356. **Byron and Shelley.** II. 3 hr. Reading and study of the works of two poets of the later Romantic Movement, together with works of criticism and scholarship related to the period.

365. **Victorian Prose.** II. 3 hr. Study of the non-fictional writings of the great Victorian prose critics: Carlyle, Ruskin, Arnold, Newman, Macaulay, Huxley, and Morris.

366. **English Literature, 1880-1918.** II. 3 hr. Study of the more important writers and literary movements of the late Victorian and the Edwardian periods; emphasis on Hardy, Housman, Hopkins, Henley, Pater, Gissing, Moore, Butler, and writers of the "Aesthetic Movement."

369. **American Literature to 1830.** I. 3 hr. Study of American literature and its informing cultural milieu and early national periods, 1607-1830.

370. **American Literature, 1830-65.** II. 3 hr. Study of the literature of the Romantic period in American literature, concentrating on Emerson, Thoreau, Poe, Hawthorne, and Melville.

371. **American Literature, 1865-1915.** I. 3 hr. Study of the literature of transcendentalism, realism, and naturalism in America between the Civil War and World War I, concentrating on Whitman, Mark Twain, Henry James, Emily Dickinson, Stephen Crane, Henry Adams, and Theodore Dreiser.

372. **American Literature, 1915-Present.** II. 3 hr. A study of American prose, poetry, and drama since 1915.

FOREIGN LANGUAGES

Faculty

Robert Stilwell, Ph.D. (U. Tex.), *Professor of German; Chairman.*
Jean-Claude Abrassart, M.A. (U. Brussels), *Instructor in French.*
Michel J. Beauchemin, M.A. (Brown U.), *Assistant Professor of Romance Languages.*
Laszlo Borsay, PhD. (U. Pitt.), *Associate Professor of Classical Languages.*
M. William Buechele, M.A. (U. Colo.), *Instructor in German.*
Richard A. Curry, Ph.D. (U. Wash.), *Assistant Professor of Spanish.*
Rafael R. del Valle, Ph.D. (Natl. U. Mex.), *Associate Professor of Latin American Studies (retired).*
Emile G. Frere, Ph.D. (U. Pitt.), *Professor of French.*
Eleanor R. Gibbard, M.A. (WVU), *Assistant Professor of French; Foreign Language Examiner.*
Pablo Gonzalez, M.A. (U. Pitt.), *Assistant Professor of Spanish.*
Gary L. Harris, Ph.D. (Ohio St. U.), *Assistant Professor of Russian.*
Francisco Herrera, M.A. (WVU), *Professor of Spanish.*
Donald T. Huffman, M.A. (Ind. U.), *Assistant Professor of German.*
Philip H. Kennedy, Ph.D. (U. N. C.), *Assistant Professor of French.*
Victor J. Lemke, Ph.D. (U. Wisc.), *Professor of German.*
Arthur C. McBride, Docteur de l'universite de Bordeaux (U. Bordeaux), *Professor Emeritus of French.*

Warren F. Manning, Ph.D. (Harvard U.), *Professor Emeritus of Romance Languages.*
Joseph A. Murphy, Ph.D. (Ohio St. U.), *Associate Professor of French.*
Jordan B. Phillips, Ph.D. (U. Ill.), *Assistant Professor of Spanish.*
Jean-Pierre M. Ponchie, Ph.D. (Mich. St. U.), *Associate Professor of French.*
Joseph J. Prentiss, Ph.D. (U. Pitt.), *Associate Professor of Classical Languages.*
Joseph F. Renahan, M.S. (Yeshiva U.), *Assistant Professor of Romance Languages.*
Armand E. Singer, Ph.D. (Duke U.), *Professor of Romance Languages.*
Claude C. Spiker, Ph.D. (U. Chicago), *Professor Emeritus of Romance Languages.*
Harley U. Taylor, Ph.D. (Ind. U.), *Associate Professor of German; Associate Chairman.*
Rebecca E. Wade, M.A. (Middlebury C.), *Assistant Professor of French (retired).*

Programs

The Department of Foreign Languages offers work in foreign languages, literatures, cultures, and in linguistics. Areas included are French, Spanish, Italian, German, Russian, Latin, Greek, Classics, Swahili, Linguistics, Language Teaching Methods, and Bibliography and Research. A student may be a candidate for an A.B. degree, with a major or minor in French, Spanish, German, Russian, or Latin, or with a minor in Russian or Greek. Students whose grades have frequently fallen below B in language work in the lower division should not select a foreign language as a major or minor. At least 36 hours of work in a given language constitutes a major and 12 hours of upper-division work in a second subject is required as a minor. All foreign language majors must take Linguistics 111. In most cases the department recommends that students who major in a foreign language should minor in a second. This is not a requirement, however, and other fields may be selected with the approval of the department chairman. During the second semester of the senior year each major will be required to take a comprehensive examination testing his control of the major language. Students who wish to earn professional certificates as elementary or secondary foreign language teachers are required to take Language Teaching Methods 221. They are also advised to consult the College of Human Resources and Education section of this *Catalog*. Students who have completed two or more years of study of a foreign language in high school can receive no credit towards a degree in the College of Arts and Sciences for either semester of the elementary work in that language.

Note 1: The basic series of foreign language courses is divided into three levels: elementary, intermediate, and advanced. The elementary level, 1 and 2, provides beginning work in the four basic skills of the language: understanding, speaking, reading, and writing, with emphasis on audiolingual procedures. The vocabulary employed is quite limited, including mainly words of high frequency. Intermediate level, 3 and 4, provides further training in the four basic skills, with much greater emphasis on reading. Here the vocabulary is greatly extended, especially the passive or recognition vocabulary. The advanced level, 103, 104, 109, and 110, is intended primarily for foreign language majors and for those few additional students who wish to master a foreign language. The four basic skills are further developed. All classroom questions and discussions are in the foreign language. The work is based on reading assignments followed by classroom discussions, oral drills, and written exercises.

Note 2: In French, German, and Spanish alternative routes are offered at the elementary and intermediate levels. Courses numbered 21, 22, 23, and 24 provide

four semesters of work intended to develop a thorough reading knowledge. In them very little attention is given to pronunciation and none at all to other aspects of the oral skills. Students read at their own pace and are given some choice as to the type of material they read in the third and fourth semesters.

Courses numbered 31, 32, 33, and 34 provide four semesters with the primary emphasis on the culture of the country or area where the foreign language is the normal means of communication. In these courses language study continues, but it is at a slower pace, is entirely practical in nature, and is always kept secondary to the study of the everyday life and the higher culture of the foreign people.

Under certain conditions it is possible for students who have begun their study of a given language in regular sections to be admitted to reading or cultural sections. It is, however, much more difficult for students to go directly from reading or cultural sections into regular sections. All changes from one of these routes to another must have the approval of the Department of Foreign Languages. Either of these four-semester alternative routes may be used to satisfy the foreign language requirement of the College of Arts and Sciences. Neither of them is recommended for foreign language majors.

No more than two semesters of elementary or intermediate foreign language credit may be counted. For example, a student having credit for French 1 may not count French 21 and 31; or if he has credit for French 3, he may not count French 23 or 33.

Special Summer Courses of Study Abroad—These courses are currently offered in Spanish, French, and German and are listed in the summer bulletin; however, they usually begin early, before the end of May, and end around the first of July. Spanish courses are held at the University of Antioquia in the Republic of Colombia. French courses are conducted at Deauville in France. The German courses are held in Wilhelmshaven. Students normally sign up for two courses at WVU, but all work is carried on overseas.

MAJOR IN FRENCH

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
French 3°	3	French 4°	3
English 1	3	English 2	3
Electives, Groups A, B, or C	3-12	Electives, Groups A, B, or C	3-12
Phys. Ed. 1	1	Phys. Ed. 2	1
	15-19		15-19

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
French 103	3	French 104	3
Minor Subjects	3-6	Minor Subject	3-6
Linguistics 111	3	Electives, Groups A, B, or C	3-9
Electives, Groups A, B, or C	3-6		
	15-18		15-18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
French 109	3	French 110	3
French 115	3	French 116	3
Minor subject and electives	12	Minor subject and electives	12
	17-18		17-18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
French 118	3	French 231	3
Minor subject and electives	15	Minor subject and electives	15
	17-18		17-18

Required courses: French 1 and 2 or equiv., 3 and 4, 103 and 104, 109 and 110, 115, 116, 118, 231.

°A student who has not had French in high school will normally take French 1 and 2 in his first year and will take French 3 and 4 concurrently with French 103 and 104 in his second year.

MAJOR IN SPANISH

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Spanish 3*	3	Spanish 4*	3
English 1	3	English 2	3
Electives, Groups A, B, or C	3-12	Electives, Groups A, B, or C	3-12
Phys. Ed. 1	1	Phys. Ed. 2	1
	15-19		15-19

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Spanish 103	3	Spanish 104	3
Minor subject	3-6	Minor subject	3-6
Linguistics 111	3	Electives, Groups A, B, or C	3-9
Electives, Groups A, B, or C	3-9		
	15-18		15-18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Spanish 109	3	Spanish 110	3
Spanish 111 or 117	3	Spanish 112 or 118	3
Minor subject and electives	12	Minor subject and electives	12
	17-18		17-18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Spanish 221	3	Spanish 222	3
Minor subject and electives	15	Minor subject and electives	15
	17-18		17-18

*A student who has not had Spanish in high school will normally take Spanish 1 and 2 in his first year and will take Spanish 3 and 4 concurrently with Spanish 103 and 104 in his second year.

Required courses: Spanish 1 and 2 or equiv., 3 and 4, 103 and 104, 109 and 110; at least 12 hr. of literature from: Spanish 111, 112, 117, 118, 221, 222.

MAJOR IN GERMAN

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
German 3*	3	German 4*	3
English 1	1	English 2	3
Electives, Groups A, B, or C	3-12	Electives, Groups A, B, or C	3-12
Phys. Ed. 1	1	Phys. Ed. 2	1
	15-19		15-19

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
German 103	3	German 104	3
Minor subject	0-3	Minor subject	0-3
Linguistics 111	3	Electives, Groups A, B, or C	3-9
Electives, Groups A, B, or C	0-6		
	15-19		15-18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
German 109	3	German 110	3
German elective	3	German elective	3
Minor subject	6	Minor subject	6
Electives	3-6		
	15-18		15-18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
German	6	German	3
Electives	9-12	Electives	12-18
	15-18		15-18

*A student who has not had German in high school will normally take German 1 and 2 in his first year and will take German 3 and 4 concurrently with German 103 and 104 in his second year.

Required courses: German 1 and 2 or equiv., 3 and 4, 103 and 104, 109 and 110; at least 12 hr. of additional courses in German literature and linguistics (See Linguistics).

MAJOR IN LATIN

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Latin 3	3	Latin 4	3
English 1	3	English 2	3
Electives, Groups A, B, or C	3-12	Electives, Groups A, B, or C	3-12
Phys. Ed. 1	1	Phys. Ed. 2	1
	15-19		15-19

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Latin elective	3	Latin elective	3
Latin 109	3	Latin 110	3
Minor subject	0-3	Minor subject	0-3
Linguistics 111	3	Electives, Groups A, B, or C	3-9
Electives, Groups A, B, or C	0-6		
	15-18		15-18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Latin 121	3	Latin 122	3
Latin elective	3	Latin elective	3
Minor subject	6	Minor subject	6
Electives	3-6	Electives	3-6
	15-18		15-18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Latin	6	Latin	3
Electives	9-12	Electives	12-15
	15-18		15-18

Required courses: Latin 1 and 2 or equiv., 3 and 4, 110, 121, 122; at least 15 hr. of additional courses in Latin literature and linguistics (See Linguistics); suggested courses: Classics 101 and 102.

COURSES OF INSTRUCTION

Professors Stilwell (*Chairman*), Frere, Herrera, Lemke, and Singer; Associate Professors Borsay, Murphy, Ponchie, Prentiss, and Taylor; Assistant Professors Beauchemin, Curry, Gibbard, Gonzalez, Harris, Huffman, Kennedy, Phillips, and Renahan; Instructors Abrassart, Buechele, and Parsons.

Courses of Instruction in French

Lower Division

1. **Elementary French.** I, II. 3 hr.

2. **Elementary French.** I, II. 3 hr. Continuation of French 1.

3. **Intermediate French.** I, II. 3 hr. PR: French 1, 2, or equiv.

4. **Intermediate French.** I, II. 3 hr. PR: French 3, or consent. Continuation of French 3.

21. **Elementary French: Programmed Reading.** I. 3 hr. Beginning French with concentration on reading comprehension.

22. **Elementary French: Programmed Reading.** II. 3 hr. PR: French 21 or equiv. Continuation of French 21.

23. **Intermediate French: Programmed Reading.** I. 3 hr. PR: French 21, 22, or equiv.

24. **Intermediate French: Programmed Reading.** II. 3 hr. PR: French 21, 22, 23, or equiv. Continuation of French 23.

31. **Elementary French: Cultural Emphasis.** I. 3 hr. Beginning French with primary emphasis on the contemporary culture of France.

32. **Elementary French: Cultural Emphasis.** II. 3 hr. PR: French 31 or equiv. Continuation of French 31.

33. **Intermediate French: Cultural Emphasis.** I. 3 hr. PR: French 31, 32, or equiv.

34. **Intermediate French: Cultural Emphasis.** II. 3 hr. PR: French 31, 32, 33, or equiv. Continuation of French 33.

For an explanation of "elementary," "intermediate," and "advanced," see Note 1, page 140. Less than 6 hours in an ancient or modern language will not be counted toward any University degree, diploma, or certificate unless work in the same language has been offered for entrance. This applies particularly to Foreign Language courses numbered 1, 2, 21, 22, 31, 32.

Upper Division

103. **Advanced French.** I. 3 hr. PR: French 3, 4, consent.

104. **Advanced French.** II. 3 hr. PR: French 103 or consent.

109. **Advanced French.** I. 3 hr. PR: French 104 or consent.

110. **Advanced French.** II. 3 hr. PR: French 109 or consent.

115. **The Classical School.** I. 3 hr. PR: 12 hr. of French or equiv.

116. **Literature of the Eighteenth Century.** II. 3 hr. PR: 12 hr. of French or equiv.

118. **Literature of the Nineteenth Century.** I. 3 hr. PR: 12 hr. of French or equiv.

203. **Refresher Course in Conversational French.** I. 3 hr. PR: Consent. Intensive spoken French.

205. **Fundamentals for Reading French.** I. 3 hr. PR: Graduate status or upper-division status. Undergraduate credit only. Graduate students must register as auditors. The sequence 205-206 is intended for graduate students from other departments to teach them to read general and technical French.

206. **Reading French.** II. 3 hr. PR: 12 hr. of French or equiv. or French 205. Undergraduate credit only. Graduate students must register as auditors. Graduate students may meet the doctoral foreign language requirement by achieving a grade of B or better in this course. Not open to Department of Foreign Languages majors.

217. **French Civilization.** II. 3 hr. PR: 12 hr. of French.

221. **The Romantic Movement.** I. 3 hr. PR: A.B. in French or consent.

222. **French Realism.** II. 3 hr. PR: A.B. in French or consent.

229. **Literature of the Sixteenth Century.** I. 3 hr. PR: A.B. in French or consent.

231. **Phonetics and Pronunciation.** II. 3 hr. PR: 18 hr. of French or equiv.

292. **Pro-Seminar.** I-6 hr.* Special topics.

326. **Literary Criticism.** II. 3 hr. PR: A.B. in French or consent.

*Variable credit courses normally carry 3 hr. credit. Exceptions are made only in emergencies and must be approved by the Department Chairman and the professor teaching the course.

327. **Graduate Reading in French.** No credit. Special course to help students prepare for the Ph.D. reading examination in French.

337. **Moliere.** II. 3 hr. PR: A.B. in French or consent.

344. **Explication de Textes.** II. 3 hr. PR: 18 hr. of French or equiv.

371. **Modern Novel to 1930.** I. 3 hr. PR: A.B. in French or consent.

372. **The Novel After 1930.** II. 3 hr. PR: A.B. in French or consent.

381. **Medieval French Literature.** II. 3 hr. PR: Linguistics 290 (Old French) or consent.

392. **Seminar.** 1-6 hr.* Special topics.

Courses of Instruction in Spanish

Lower Division

1. **Elementary Spanish.** I, II. 3 hr.

2. **Elementary Spanish.** I, II. 3 hr. Continuation of Spanish 1.

3. **Intermediate Spanish.** I, II. 3 hr. PR: Spanish 1, 2, or equiv.

4. **Intermediate Spanish.** I, II. 3 hr. PR: Spanish 3 or consent. Continuation of Spanish 3.

21. **Elementary Spanish: Programmed Reading.** I. 3 hr. Beginning Spanish with concentration on reading comprehension.

22. **Elementary Spanish: Programmed Reading.** II. 3 hr. PR: Spanish 21 or equiv. Continuation of Spanish 21.

23. **Intermediate Spanish: Programmed Reading.** I. 3 hr. Spanish 21, 22, or equiv.

24. **Intermediate Spanish: Programmed Reading.** II. 3 hr. PR: Spanish 21, 22, 23, or equiv. Continuation of Spanish 23.

31. **Elementary Spanish: Cultural Emphasis.** I. 3 hr. Beginning Spanish with primary emphasis on the contemporary culture of Spain and Latin America.

32. **Elementary Spanish: Cultural Emphasis.** II. 3 hr. PR: Spanish 31 or equiv. Continuation of Spanish 31.

33. **Intermediate Spanish: Cultural Emphasis.** I. 3 hr. PR: Spanish 31, 32, or equiv.

34. **Intermediate Spanish: Cultural Emphasis.** II. 3 hr. PR: Spanish 31, 32, 33, or equiv. Continuation of Spanish 33.

For an explanation of "elementary," "intermediate," and "advanced," see Note 1, page 140. Less than 6 hours in an ancient or modern language will not be counted toward any University degree, diploma, or certificate unless work in the same language has been offered for entrance. This applies particularly to Foreign Language courses numbered 1, 2, 21, 22, 31, 32.

Upper Division

103. **Advanced Spanish.** I. 3 hr. PR: Spanish 3, 4, or consent.

104. **Advanced Spanish.** II. 3 hr. PR: Spanish 103 or consent.

109. **Advanced Spanish.** I. 3 hr. PR: Spanish 104 or consent.

110. **Advanced Spanish.** II. 3 hr. PR: Spanish 109 or consent.

111. **Nineteenth Century Literature to 1870.** I. 3 hr. PR: Spanish 3, 4, or equiv.

112. **Spanish Literature Since 1870.** II. 3 hr. PR: Spanish 3, 4, or equiv.

116. **Spanish Civilization and Culture.** I. 3 hr. PR: 12 hr. of Spanish or equiv.

117. **Spanish-American Literature.** I. 3 hr. PR: 12 hr. of Spanish or equiv.

118. **Spanish-American Literature.** II. 3 hr. PR: 12 hr. of Spanish or equiv.

221. **Literature of the Golden Age to 1635.** I. 3 hr. PR: 18 hr. of Spanish or equiv.

222. **The Golden Age After Lope De Vega.** II. 3 hr. PR: 18 hr. of Spanish or equiv.

223. **Estudios de Estilo.** I. 3 hr. PR: 18 hr. of Spanish or equiv.

292. **Pro-Seminar.** 1-6* hr. Special topics.

315. **Lyric Poetry.** I. 3 hr. PR: 12 hr. of Spanish or equiv.

324. **Explicacion de Textos.** II. 3 hr. PR: 18 hr. of Spanish or equiv.

325. **The Picaresque Novel.** I. 3 hr. PR: 18 hr. of Spanish or equiv.

327. **Graduate Reading in Spanish.** No credit. Special course to help students prepare for the Ph.D. reading examination in Spanish.

391. **Cervantes.** II. 3 hr. PR: 18 hr. of Spanish or consent.

392. **Seminar.** 1-6* hr. Special topics.

395. **Sixteenth Century Literature.** I. 3 hr. PR: 18 hr. of Spanish or consent.

Less than 6 hours in an ancient or modern language will not be counted toward any University degree, diploma, or certificate unless work in the same language has been offered for entrance. This applies particularly to Foreign Language courses numbered 1, 2, 21, 22, 31, 32.

Courses of Instruction in Italian

Lower Division

1. **Elementary Italian.** I. 3 hr.

2. **Elementary Italian.** II. 3 hr. Continuation of Italian 1.

3. **Intermediate Italian.** I. 3 hr. PR: Italian 1, 2, or equiv.

4. **Intermediate Italian.** II. 3 hr. PR: Italian 3 or consent. Continuation of Italian 3.

Courses of Instruction in German

Lower Division

1. **Elementary German.** I, II. 3 hr.

2. **Elementary German.** I, II. 3 hr.

3. **Intermediate German.** I, II. 3 hr. PR: German 1 and 2, or equiv.

4. **Intermediate German.** I, II. 3 hr. PR: German 3, or consent. Continuation of German 3..

*Variable credit courses normally carry 3 hr. credit. Exceptions are made only in emergencies and must be approved by the Department Chairman and the professor teaching the course.

21. **Elementary German: Programmed Reading.** I. 3 hr. Beginning German with concentration on reading comprehension.

22. **Elementary German: Programmed Reading.** II. 3 hr. PR: German 21 or equiv. Continuation of German 21.

23. **Intermediate German: Programmed Reading.** I. 3 hr. PR: German 21, 22, or equiv.

24. **Intermediate German: Programmed Reading.** II. 3 hr. PR: German 21, 22, 23, or equiv. Continuation of German 23.

31. **Elementary German: Cultural Emphasis.** I. 3 hr. Beginning German with primary emphasis on the contemporary culture of Germany.

32. **Elementary German: Cultural Emphasis.** II. 3 hr. PR: German 31 or equiv. Continuation of German 31.

33. **Intermediate German: Cultural Emphasis.** I. 3 hr. PR: German 31, 32, or equiv.

34. **Intermediate German: Cultural Emphasis.** II. 3 hr. PR: German 31, 32, 33, or equiv. Continuation of German 33.

For an explanation of "elementary," "intermediate," and "advanced," see Note 1, page 140. Less than 6 hours in an ancient or modern language will not be counted toward any University degree, diploma, or certificate unless work in the same language has been offered for entrance. This applies particularly to Foreign Language courses numbered 1, 2, 21, 22, 31, 32.

Upper Division

103. **Advanced German.** I. 3 hr. PR: German 3, 4, or consent.

104. **Advanced German.** II. 3 hr. PR: German 103 or consent.

105. **The German Novelle.** I. 3 hr. PR: German 3, 4, or consent. Representative stories of Keller, Meyer, Storm, and Stifter.

106. **The German Novelle.** II. 3 hr. PR: German 3, 4, or consent. From Naturalism to present day. Continuation of German 105.

107. **Nineteenth Century Drama.** I. 3 hr. PR: German 3, 4, or consent. Critical study of selected dramas by Kleist, Grillparzer, Hebbel, and Ludwig.

108. **Nineteenth Century Drama.** II. 3 hr. PR: German 3, 4, or consent. Continuation of German 107.

109. **Advanced German.** I. 3 hr. PR: German 104 or consent. See **Note** on page 140.

110. **Advanced German.** II. 3 hr. PR: German 109 or consent. See **Note** on page 140.

121. **Scientific German.** I. 3 hr. PR: German 1, 2. Primarily for students in science courses.

122. **Scientific German.** II. 3 hr. Continuation of German 121.

136. **Introduction to Goethe.** II. 3 hr. PR: German 3, 4, or consent.

163. **Modern German Prose in English Translation.** I. 3 hr. Reading and discussion of outstanding German short stories and a few novels. (No credit allowed for departmental major or for regular language requirements.)

242. **Faust.** II. 3 hr. PR: German 4, or consent. Critical study of Goethe's *Faust*.

243. **Medieval German Literature.** I. 3 hr. PR: German 4 or consent.

244. **German Literature of the Reformation and Renaissance.** II. 3 hr. PR: German 4 or consent.

245. **Classicism and Romanticism.** I. 3 hr. PR: German 4 or consent. A critical study of German literature from 1750 to 1830.

246. **The Liberal Age.** II. 3 hr. PR: German 4 or consent. A critical study of German literature from 1830 to 1880, with emphasis upon poetic realism.

247. **The Age of Crisis.** I. 3 hr. PR: German 4 or consent. Critical study of German literature from 1880 to the present.

265. **German Civilization.** I. 3 hr. PR: 12 hr. of German or consent. A general comprehensive survey of the most important aspects of German culture, including a brief historical background, the development of the German language, geography, science, music, art, architecture, literature, and philosophy.

292. **Pro-Seminar.** 1-6 hr.* Special topics.

301. **Independent Reading.** I. 3 hr. Supervised reading for students who want to do intensive work in any field of interest.

302. **Independent Reading.** II. 3 hr. Continuation of German 301.

327. **Graduate Reading in German.** No credit. Special course to help students prepare for the Ph.D. reading examination in German.

361. **Lyric Poetry.** I. 3 hr. PR: German 3, 4, or consent.

375. **The Modern Novel.** I. 3 hr. PR: 18 hr. of German. Supervised reading of nineteenth century novels.

376. **The Modern Novel.** II. 3 hr. Continuation of German 275, with emphasis on recent fiction.

392. **Seminar.** 1-6 hr.* Special topics.

Courses of Instruction in Russian

Lower Division

1. **Elementary Russian.** I. 3 hr.

2. **Elementary Russian.** II. 3 hr. Continuation of Russian 1.

3. **Intermediate Russian.** I. 3 hr. PR: Russian 1, 2, or equiv.

4. **Intermediate Russian.** II. 3 hr. PR: Russian 3 or consent. Continuation of Russian 3.

For an explanation of "elementary," "intermediate," and "advanced," see Note 1, page 140. Less than 6 hours in an ancient or modern language will not be counted toward any University degree, diploma, or certificate unless work in the same language has been offered for entrance. This applies particularly to Foreign Language courses numbered 1, 2, 21, 22, 31, 32.

Upper Division

103. **Advanced Russian.** I. 3 hr. PR: Russian 3, 4, or consent.

104. **Advanced Russian.** II. 3 hr. PR: Russian 103 or consent.

105. **The Russian Short Story.** I. 3 hr. PR: 12 hr. of Russian or equiv.

106. **The Russian Short Story.** II. 3 hr. PR: 12 hr. of Russian or equiv. Continuation of Russian 105.

109. **Advanced Russian.** I. 3 hr. PR: Russian 104 or consent. See Note, page 140.

110. **Advanced Russian.** II. 3 hr. PR: Russian 109 or consent. See Note, page 140.

121. **Scientific Russian.** I. 3 hr. PR: Russian 1, 2, or equiv. Primarily for students in science courses.

122. **Scientific Russian.** II. 3 hr. PR: Russian 121 or consent. Continuation of Russian 121.

144. **Survey of Russian Literature.** I. 3 hr. PR: Russian 3, 4, or consent.

145. **Survey of Russian Literature.** II. 3 hr. Continuation of Russian 144.

211. **The Russian Novel.** I. 3 hr. PR: Russian 3, 4, or consent. Study of selected work of Gogol, Goncherov, Turgenev, Leskov, Dostoyevsky, and Tolstoy.

212. **The Russian Novel.** II. 3 hr. Continuation of Russian 211. Study of Russian prose from Chekhov to the post-war Soviet novelists.

213. **Survey of Russian Literature in Translation.** I. 3 hr. PR: Junior standing or consent. Major works of Russian authors from the beginning to 1880 including those of Pushkin, Lermontov, Gogol, Turgenev, Dostoyevsky, and Tolstoy. Russian majors to read selections in the original.

214. **Survey of Russian Literature in Translation.** II. 3 hr. PR: Junior standing or consent. Continuation of Russian 213. The major literature of the Soviet Union from 1880 to the present. Russian majors to read selections in the original.

Courses of Instruction in Latin

Lower Division

1. **Elementary Latin.** I. 3 hr.

2. **Elementary Latin.** II. 3 hr. Continuation of Latin 1.

3. **Intermediate Latin.** I. 3 hr. PR: Latin 1, 2, or two years of high-school Latin. Selections from Caesar, Aulus, Gellius, and Nepos, and from other authors of comparable difficulty; designed to prepare students to read orations of Cicero.

Less than 6 hours in an ancient or modern language will not be counted toward any University degree, diploma, or certificate unless work in the same language has been offered for entrance. This applies particularly to Foreign Language courses numbered 1, 2, 21, 22, 31, 32.

Upper Division

109. **Selections from Roman Prose.** I. 3 hr. PR: Latin 3, 4, or equiv.

110. **Selections from Roman Poetry.** II. 3 hr. PR: Latin 4, 109, or equiv.

°Variable credit courses normally carry 3 hr. credit. Exceptions are made only in emergencies and must be approved by the Department Chairman and the professor teaching the course.

113. **Roman Biographers.** I. 3 hr. PR: Latin 3, 4, or consent. Selections from the *Famous Men* of Cornelius Nepos, and from the Silver Age biographers.

114. **Roman Elegy.** II. 3 hr. PR: Latin 3 or 4 or consent. Selections from Ovid.

121. **Survey of Latin Literature.** I. 3 hr. PR: Latin 109 and 110 or consent.

122. **Survey of Latin Literature.** II. 3 hr. PR: Latin 109 or 110 or consent.

131. **Latin Prose Composition.** II. 3 hr. PR: Latin 3 or 4 or consent. Advanced grammar and composition.

192. **Special Topics.** I, II. 3 hr. PR: Latin 4 or consent. Selected writings and special problems in Latin literature.

201. **Roman Novelists.** I. 3 hr. PR: Latin 109, 110, or equiv. The origin of the novel is traced from Homer to the Medieval Greek and Latin romance writers. Readings include selections from Petronius the *Cena Trimalchionis*, and from Apuleius, *Cupid and Psyche.*

202. **Roman Comedy.** II. 3 hr. PR: Latin 109, 110, or equiv. Brief history of the origin and development of Greek and Roman comedy. Readings include the *Menaechmi* of Platus, and the *Andria* of Terence.

231. **Roman Satire.** I. 3 hr. PR: Latin 109, 110, or equiv. Greek satirical writings and the origin of the Roman satire. Readings include selections from the *Satires* of Horace, and from the *Satires* of Persius and Juvenal.

234. **Roman Historians.** I. 3 hr. PR: Latin 109, 110, or equiv. Origin and development of Roman historiography and its Greek antecedents. Readings include selections from Livy's *History*, from Tacitus' *Agricola*, and from Suetonius' *Augustus.*

235. **Roman Epic.** I. 3 hr. Latin 109, 110, or equiv. Origin and development of the Greek and Roman epic. Readings include selections from Vergil's *Aeneid*, from Lucretius' *De Rerum Natura*, and from the earlier and later epic poets.

236. **Roman Philosophers.** II. 3 hr. PR: Latin 109, 110, or equiv. Origin and development of Greek philosophy and its influence upon Roman philosophy. Readings include selections from Cicero's *Tusculan Disputations* on the immortality of the soul and from Seneca's *Epistles.*

237. **Roman Lyric Poetry.** I. 3 hr. PR: Latin 109, 110, or equiv. Origin and development of the Greek and Roman lyric poetry. Readings include selections from Horace, Catullus, Tibullus, and Propertius.

292. **Pro-Seminar.** 1-6 hr.* Special topics.

392. **Seminar.** 1-6 hr.* Special topics.

Courses of Instruction in Greek

Lower Division

1. **Elementary Greek.** I. 3 hr.

2. **Elementary Greek.** II. 3 hr. Continuation of Greek 1.

3. **Intermediate Greek.** I. 3 hr.

4. **Intermediate Greek.** II. 3 hr. Continuation of Greek 3.

Less than 6 hours in an ancient or modern language will not be counted toward any University degree, diploma, or certificate unless work in the same language has been offered for entrance. This applies particularly to Foreign Language courses numbered 1, 2, 21, 22, 31, 32.

Upper Division

109. **Selections from Medieval and Modern Greek Literature.** I. 3 hr.

110. **Selections from the Attic Orators.** II. 3 hr.

111. **New Testament Greek.** I. 3 hr. PR: Consent. Selections from the *Septuagint*, the Greek *New Testament*, and the early Church Fathers.

121. **Survey of Greek Literature.** I. 3 hr. PR: Greek 109, 110, or consent.

122. **Survey of Greek Literature.** II. 3 hr. Continuation of Greek 121.

292. **Pro-Seminar.** 1-6 hr.° Special topics.

392. **Seminar.** 1-6 hr.° Special topics.

Courses of Instruction in Swahili

Lower Division

1. **Elementary Swahili.** I. 3 hr.

2. **Elementary Swahili.** II. 3 hr. Continuation of Swahili 1.

3. **Intermediate Swahili.** I. 3 hr. PR: Swahili 1, 2, or equiv.

4. **Intermediate Swahili.** II. 3 hr. PR: Swahili 3 or consent. Continuation of Swahili 3.

Less than 6 hours in an ancient or modern language will not be counted toward any University degree, diploma, or certificate unless work in the same language has been offered for entrance. This applies particularly to Foreign Language courses numbered 1, 2, 21, 22, 31, 32.

Courses of Instruction in Linguistics

Lower Division

1. **Introduction to Language.** I, II, S. 3 hr. General introduction to the different languages of the world. Oral and written communication.

Upper Division

111. **Introduction to Structural Linguistics.** I. 3 hr. Required for foreign language majors.

201. **Linguistics As Applied to Spanish-American Dialects.** I. 3 hr. PR: A.B. in Spanish or consent. To acquaint students with the principles of structural linguistics and those points of structure and vocabulary in which American Spanish differs from standard Castilian.

225. **Comparative Grammar of Greek and Latin.** I. 3 hr. PR: Consent.

226. **Italic Dialects.** II. 3 hr. PR: Consent.

227. **Vulgar Latin.** II. 3 hr. PR: Latin, 109, 110, or equiv. Selections from Latin inscriptions and later Latin literature are studied to illustrate the development of Latin from its earliest times to its passing into the Romance languages.

°Variable credit courses normally carry 3 hr. credit. Exceptions are made only in emergencies and must be approved by the Department Chairman and the professor teaching the course.

231. **The Structure of Modern Russian.** I. 3 hr. PR: 12 hr. of Russian or consent. Advanced study of Russian phonetics and phonemics.

232. **The Structure of Modern Russian.** II. 3 hr. PR: Linguistics 231 or consent. Advanced study of Russian morphology and syntax.

251. **History of the German Language.** I. 3 hr. PR: 18 hr. of German or consent. Historical development of standard German with emphasis on its relationships to the other German languages and dialects.

255. **History of the Spanish Language.** I. 3 hr. PR: A.B. in Spanish or consent. A study of the development of the Spanish language and of the transformation of the Castilian dialect into the national language of Spain.

292. **Pro-Seminar.** 1-6 hr.* Special topics.

311. **Middle High German.** I. 3 hr. PR: 12 hr. of German from upper division. Study of the linguistic developments of Middle High German from the eleventh to the fifteenth centuries with illustrative readings from the *Nibelungelied.*

312. **Middle High German.** II. 3 hr. Continuation of Linguistics 311 with illustrative readings from the Middle High German lyric poets and the courtly epics.

352. **Comparative Germanic Linguistics.** II. 3 hr. PR: Linguistics 251 or consent. A comparative study of Gothic, Old English, Old Norse, Old High German, and Old Saxon.

371. **Old English.** I. 3 hr. PR: Consent. Elementary study of Old West Saxon with illustrative materials from prose and poetry.

372. **Old English.** II. 3 hr. Continuation of Linguistics 371. Comparison of the Old English dialects, with extensive illustrative reading, especially in *Beowulf.*

381. **Old Norse.** I. 3 hr. PR: Consent. Elementary study of Old West Norse prose.

382. **Old Norse.** II. 3 hr. Continuation of Linguistics 381. Readings in various Old Icelandic sagas; introduction to Old Norse poetry.

390. **Old French.** II. 3 hr. PR: Consent.

392. **Seminar.** 1-6 hr.* Special topics.

396. **Old Spanish.** II. 3 hr. PR: Consent.

Courses of Instruction in Language Teaching Methods

Upper Division

221. **The Teaching of Foreign Languages.** I. 3 hr. Required of all students who are prospective foreign language teachers.

222. **Language Laboratory Techniques.** II. 3 hr.

270. **Problems in the Teaching of French in the Elementary School.** I. 3 hr. PR: Consent.

*Variable credit courses normally carry 3 hr. credit. Exceptions are made only in emergencies and must be approved by the Department Chairman and the professor teaching the course.

Courses of Instruction in Bibliography and Research

Upper Division

365. **Methods of Research.** I. 3 hr.

GEOLOGY AND GEOGRAPHY

Alan C. Donaldson, Ph.D. (Penn. St. U.), *Chairman; Professor of Geology.*
Robert E. Behling, Ph.D. (Ohio St. U.), *Assistant Professor of Geology.*
Hugh Buchanan, Ph.D. (Columbia U.), *Assistant Professor of Geology.*
Robert Davis, M.S. (Ariz. St. U.), *Assistant Professor of Geography.*
Chester L. Dodson, M.S. (WVU), *Assistant Professor (p-t) of Geology.*
Robert B. Erwin, Ph.D. (Cornell U.), *Professor of Geology.*
William Gillespie, M.S. (WVU), *Instructor (p-t) in Geology.*
Milton T. Heald, Ph.D. (Harvard U.), *Professor of Geology.*
Richard S. Little, Ph.D. (Syracuse U.), *Associate Professor of Geography.*
Paul W. Queen, M.A. (WVU), *Instructor (p-t) in Geology.*
Henry Rauch, Ph.D. (Penn. St. U.), *Assistant Professor of Geology.*
John J. Renton, Ph.D. (WVU), *Associate Professor of Geology.*
Robert C. Shumaker, Ph.D. (Cornell U.), *Professor of Geology.*
Steven M. Warshauer, Ph.D. (U. Cincinnati), *Assistant Professor of Geology.*
Dana Wells, Ph.D. (Columbia U.), *Professor Emeritus of Geology.*
Russell L. Wheeler, B.S. (Yale U.), *Assistant Professor of Geology.*
Chester E. Zimolak, M.S. (U. Wisc.), *Assistant Professor of Geography.*

Bachelor of Science in Geology

The Bachelor of Science degree is designed for students who want to qualify for professional positions in industry and government services as well as those who plan to do graduate work in geology. A total of 134 hours is required, of which a minimum of 124 hours must be established in subjects exclusive of credits earned in required Physical Education and Math. 2. Electives must be chosen so as to meet the basic requirements of the College of Arts and Sciences.

Admission to the program requires at least a 2.0 average in all geology courses. Required electives in cognate fields include Math. 3, 4, and 15; Physics 1 (11) and 2 (12); Chem. 15 and 16; Stat. 101 and 201 or Math. 16; and C.E. 1, or the equiv. Students are urged to elect some supporting courses in such allied fields as mining or petroleum engineering, biology, geography, soil mechanics, pedology, and computer science, depending on their major field of geologic studies. A total of 44 hours of non-geology electives are required of which 24 hours are needed to fulfill the Core Curriculum; the balance can be hours in geology, cognate fields, and electives of general interest to the student, with the adviser's consent.

Candidates for the Bachelor of Science degree in Geology are required to take a total of 40 hours of geology courses, 32 hours of which include the following courses or equivalents: Geol. 1, 2, 3, 4, 151, 184, 221, 261, and 266. Most students should elect Geol. 231 for optimum general development or oceanography emphasis.

Qualified students are encouraged to participate in the departmental Honors Program which begins either the Second Semester of the junior year or the First Semester of the senior year and culminates in a senior thesis. The Honors Program is for students with a cumulative grade-point average of at least 3.0 in all courses completed by the end of the fifth semester

and a grade-point average higher than 3.0 in geology. Promising students with grade-point averages slightly below 3.0 are eligible for the Independent Studies Program, with consent of a department committee.

Instructional facilities and equipment include the labs associated with mineralogy, petrology, geochemistry, sedimentology, paleontology, geomorphology, mineral and fuel resources, and structural geology. Field studies are stressed with geologic mapping at Camp Wood in Greenbrier County; carbonate sediments and their depositional environments in the Florida Keys; sedimentation and coastal processes on eastern shore of Virginia; pollution measurements in nearby streams and lakes; field trips to glaciated areas; examinations of processes acting on earth's surface in West Virginia; and structural and stratigraphic analyses of the Appalachian basin and orogenic belt. Subsurface logs and samples are available for study by the West Virginia Geological Survey situated in the same building and the Bureau of Mines on the outskirts of Morgantown.

Suggested Schedule of Required and Recommended Courses

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Chem. 15	4	Chem. 16	4
Foreign Lang.	3	Foreign Lang.	3	Foreign Lang.		Foreign Lang.	
Geol. 1	3	Geol. 3 & 4	4	(if necessary)	0-3	(if necessary)	0-3
Geol. 2	1	Math. 4	3	Math. 15	4	C.E. 1	2
Math. 3	3	Phys. Ed. 2	1	Geol. 184	4	Geol. 185	4
Phys. Ed. 1	1	Electives	3	Electives	3-6	Electives	5-8
Electives	3						
	17		17		18		18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Geol. 151	4	Geol. 261	3	Geol. 221	3	Geol. elect.*	4
Physics 1 (11)	4	Physics 2 (12)	4	Geol. elect.	4	Electives*	13
Statistics 101	3	Stat. 201		Electives*†	10		
Electives*	3	or Math. 16	3-4				
Geol. 231†	4	Electives*	6				
	18		16-17		17		17

Summer

Geology 266 ..... 6 hours

*Electives recommended by student's adviser.
†Geol. 231 should be elected in the general geology program.

Bachelor of Arts in Geology

The course requirements for the Bachelor of Arts degree with a major in geology are designed for students who want to go into careers that require a good background in the basic principles of geology. Areas such as environmental science, planning, or other earth-related sciences, secondary school teaching, or earth science laboratory technical work may be pursued by proper choice of electives.

Admission to the program requires at least a 2.0 average in all geology courses. Continuance in the program for the third and subsequent semesters requires a cumulative average of 2.0 for courses in geology taken in this department.

Laboratory Fees

A nonrefundable fee is required of all students who take the following laboratory courses in the Department of Geology:

Geol. 2, 4, 25, 184, 185, 202, 221, 222, 228, 231, 235, 261, and 272 ..... $10.00 per semester

BACHELOR OF ARTS IN GEOLOGY

See "Regulations Affecting Degrees" on page 106.

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3
Foreign Lang.	3	Foreign Lang.	3
Geol. 1	3	Geol. 3	3
Geol. 2	1	Geol. 4	1
Math. 2 or 3	3	Math. 4	3
Elective***	3	Elective***	3
Phys. Ed. 1	1	Phys. Ed. 2	1
	17		17

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4
Foreign Lang. (if necessary)	0-3	Foreign Lang. (if necessary)	0-3
Electives***	10-13	Geol. 109	3
		Electives***	7-10
	17		17

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Geol. 151	4	Science elect.	3
Geol. 184	4	Geol. 261	3
Physics 1	4	Physics 2	4
Electives	5	Electives	7-8
	17		17-18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Geol. 127	2	Geol. 231	4
Geol. 221	3	Electives	13
Electives	12		
	17		17

***Electives must be chosen first to satisfy the WVU Core Curriculum.

Courses of Instruction in Geology

Professors Donaldson (*Chairman*), Erwin (Adjunct), Heald, and Shumaker; Associate Professors Little and Renton; Assistant Professors Behling, Buchanan, Davis, Dodson (part-time), Rauch, Warshauer, Wheeler, and Zimolzak; Instructors Gillespie (part-time) and Queen (part-time).

Geol.

Lower Division

1. **Physical Geology.** I, II. 3 hr. Description of composition and structure of earth physical processes which change earth's surface. Geol. 2 not required with Geol. 1. Registration in Geol. 2 meets requirements for 4 hr. credit in a laboratory science in physical geology. Credit cannot be obtained for both Geol. 1 and Geol. 5.

2. **Physical Geology Laboratory.** I, II. 1 hr. May be taken for credit without previous or concurrent geology background. ($10.00 lab fee.)

3. **Historical Geology.** I, II. 3 hr. PR: Geol. 1 or Geol. 5 or conc. with consent. Evolution of earth and its inhabitants. Accompanied by Geol. 4 to meet requirements of 4 hr. credit in a laboratory science in historical geology.

4. **Historical Geology Laboratory.** I, II. 1 hr. Accompanies Geol. 3. PR: Geol. 3 or conc. with Geol. 3. ($10.00 lab fee.)

5. **Introduction to Geology.** I, II. 3 hr. Designed especially for non-science majors. Composition and structure of earth and geologic processes which shape its surface. Geol. 2 not required with Geol. 5. Accompanied by Geol. 2 to meet requirements for 4 hr. credit in a laboratory science in physical geology. Credit cannot be obtained for both Geol. 1 and Geol. 5.

25. **Geologic Drafting.** I. 1 hr. ($10.00 lab fee.)

Upper Division

127. **Map Interpretation.** I. 2 hr. PR: Geol. 1 or 5. Relation of earth structure and history to land forms as shown on topographic maps.

151. **Structural Geology.** I. 1-4 hr. PR: Geol. 1, 2, or consent; plane geometry, high school algebra, plane trigonometry, and high school physics, or consent. Introduction to stress, strain, and related behaviors of geologic materials in nature, theory, and experiment. Descriptions and theories of brittle and ductile deformation of rocks on minor and major scales. Interpretation of rocks' observed structures as records of physical processes operating within the earth's crust.

184. **Mineralogy.** I. 4 hr. PR: Geol. 1, Chem. 15, or conc. Elements of crystallography and systematic study of minerals except silicates. Identification of minerals by their physical properties supplemented by blow-pipe analysis. ($10.00 lab fee.)

185. **Mineralogy and Petrography.** II. 4 hr. PR: Geol. 184. Description, mode of occurrence, and classification of silicate minerals and rocks. ($10.00 lab fee.)

201. **Physical Geology for Teachers.** I, II, S. 3 hr. PR: High school teaching certificate and consent. Composition and structure of earth and the geologic processes which shape its surface.

202. **Physical Geology Laboratory for Teachers.** I, II, S. 1 hr. Accompanies Geol. 201. Laboratory and field study of earth materials and features, and the topographic and geologic maps used to represent them. ($10.00 lab fee.)

218. **Geology and the Earth Sciences.** I. 4 hr. PR: Geol. 151. Physical nature of the earth. Rotation, revolution, shape, and structure of the earth. Geologic forces changing the earth. Geologic history.

221. **Geomorphology.** I. 3 hr. PR: Geol. 1 or 5. An examination of the physical processes which shape the surface of the earth, with emphasis on fluvial processes and environmental geomorphology. Optional field trip at student's expense. ($10.00 lab fee.)

222. **Geomorphology.** II. 3 hr. PR: Geol. 1 or 5. A consideration of glaciology and glacial geology as pertains to erosion and deposition by glaciers. The Pleistocene history of North America is stressed. Optional field trip at student's expense. ($10.00 lab fee.)

228. **Photogeology.** II. 3 hr. PR: Geol. 127, 151, or consent. Instruction in basic and advanced techniques of air photo interpretation. ($10.00 lab fee.)

231. **Invertebrate Paleontology.** I. 4 hr. PR: Geol. 3, 4, or consent. Invertebrate fossils: biologic classification, evolutionary development, ecology, and use in correlation of strata. ($10.00 lab fee.)

235. **Introductory Paleobotany.** I, II. 4 hr. PR: Geol. 3. Resume of development of principal plant groups through the ages, present distribution, mode of occurrence and index species, methods of collection. Required Saturday field trips at student's expense. ($10.00 lab fee.)

261. **Stratigraphy and Sedimentation.** II. 3 hr. PR: Geol. 1 or consent. Study of sediments and sedimentary rocks. Field techniques stressed as data gathered and interpreted from rocks of Pennsylvanian age in Morgantown vicinity. Two-day field trip required. Basic field equipment and field trips at student's expense. ($10.00 lab fee.)

266. **Appalachian Geology Field Camp.** S. 6 hr. PR: Geol. 151, 261. Practical experience in detailed geological field procedures and mapping. Living expense in addition to tuition must be paid at time of registration.

270. **Mineral Resources.** I. 3 hr. PR: Geol. 151. Description, mode of occurrence and principles governing the formation of ore deposits.

272. **Petroleum Geology.** II. 1-4 hr. PR: Geol. 151. Origin, geologic distribution, methods of exploration and exploitation, uses and future reserves of petroleum and natural gas in the world. ($10.00 lab fee.)

290. **Geologic Problems.** I, II. 1-6 hr. (12 hr. max.). Special problems for seniors and graduates. (Sec. 10: Junior honors students; Sec. 11: Senior honors thesis.)

291. **Geology Seminar.** I, II. 1 hr. (6 hr. max.). PR: Geol. 151, 185, 261, or consent. Syntheses and description of the regional geology of selected areas around the world, prepared and presented by the students. Areas to be studied will change from term to term. To be offered whenever sufficient demand exists.

294. **Introduction to Geochemistry.** II. 4 hr. PR: Chem. 16. A basic review of physical and aqueous chemistry, discussion of the basic geochemical processes; calcium carbonate chemistry, diagenetic processes, weathering, the silicate and iron systems.

329. **Problems in Geomorphology.** I, II. 1-4 hr.

334. **Problems in Paleontology.** I, II. 1-4 hr.

336. **Advanced Paleobotany.** I, II. 4 hr. Continuation of Geol. 235.

339. **Problems in Paleobotany.** I, II. 1-4 hr.

340. **Advanced Stratigraphy.** II. 4 hr. PR: Geol. 231. Study of principles of rock and time correlation, and their application to the stratigraphy of West Virginia. Emphasis on carbonate rocks.

344. **Clay Geology.** I, II. 2-3 hr. PR: Geol. 185, 261, 369. Study of clay mineralogy with secondary emphasis on the origin and deposition of clay minerals in the stratigraphic record.

346. **Advanced Sedimentation.** I. 4 hr. PR: Geol. 185. Origin of sedimentary rocks; principles involved in interpretation of ancient geography, climates, animals, and plants. Emphasis on detrital sediments and rocks. Required field trips at student's expense.

348. **Problems in Sedimentation.** I, II. 1-4 hr.

349. **Problems in Stratigraphy.** I, II. 1-4 hr.

351. **Tectonic Elements.** II. 3 hr. PR: Geol. 151 or consent. Theories of large scale deformational processes operating within the earth's crust and upper mantle. Study of the regional structural geology of selected orogens as tests of these theories and as examples of the records produced by these processes.

359. **Problems in Structural Geology.** I, II. 1-4 hr.

362. **Sedimentology Field Camp.** S. 3-6 hr. PR: Geol. 261 or equivalent. Field-lab course in experimental, modern, and ancient sedimentation. Living expenses in addition to tuition must be paid at time of registration. Field expenses extra.

363. **Ground-water Hydrology.** I. 3 hr. PR: Geol. 1 or consent. Study of the principles of ground-water hydrology; occurrence, development, uses, and conservation of ground-water.

369. **X-Ray Diffraction.** I, II. 3 hr. PR: Chem. 16 or consent. Theory of X-ray diffraction and application to the analysis of crystalline materials using the powder camera and X-ray diffractometer. Open to advanced students in geology, chemistry, engineering, and related fields, with consent of instructor.

371. **Economic Geology: Ore Deposits.** II. 3 hr. PR: Geol. 185. Mineral composition, geologic features, and distribution of deposits of principal useful metallic minerals.

372. **Economic Geology: Nonmetallics.** I. 3 hr. PR: Geol. 185. Occurrence, formation, and use of nonmetallic mineral substances, including building materials and chemicals.

374. **Problems in Economic Geology and Geochemistry.** I, II. 1-4 hr.

385. **Optical Mineralogy.** I. 4 hr. PR: Geol. 185 and one year of physics. Principles and practice in use of the petrographic microscope in identification of minerals. Emphasis on determination by immersion method.

386. **Petrology.** II. 4 hr. PR: Geol. 385. Composition, texture, occurrence, and origin of rocks. Study of hand specimens and thin sections.

388. **Problems in Mineralogy and Petrology.** I, II. 1-4 hr.

394. **Physical Geochemistry.** I. 3 hr. PR: Geol. 294 or consent. Phase diagrams, metamorphic facies, origin of the elements, chemical properties of ions, crystal chemistry of minerals, element distributions and geochemical cycles.

395. **Aqueous Geochemistry.** I, II. 3 hr. PR: Geol. 294 or consent. Review of basic chemical principles as they apply to aqueous geologic environments. Properties of water and the types, sources, and controls of the common and environmentally significant chemical species dissolved in water.

396. **Aqueous Geochemistry Lab.** II. 2 hr. PR: Geol. 395 previous or concurrent. Laboratory and field methods for geochemical water analysis, significance of natural and polluted waters is emphasized. Several field trips are required to area streams.

399. **Quantitative Methods in Geo-Sciences.** II. 4 hr. PR: Stat. 101, 201, and 202 or 311, 312, and consent. Brief review and introduction to specific quantitative techniques as applied to geology and geography.

BACHELOR OF ARTS IN GEOGRAPHY

It is strongly recommended that students majoring in geography have a strong minor in either economics, sociology, political science, history, geology, or statistics (other fields will be considered upon petition). The elective hours in the junior and senior years are to be used for this specific purpose. Students who intend to do graduate work should take at least Math. 15 in lieu of Math. 8. Stat. 101 or more advanced work in statistics is strongly recommended.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Geog. 109	3	Geog. 105	3
Geol. 1	3	Geol. 3	3	Math. 8	3	Geog. 107	3
Geol. 2	1	Geol. 4	1	Econ. 51	3	Foreign Lang.	
Geog. 7	3	Geog. 8	3	Foreign Lang.		(if necessary)	0-3
Foreign Lang.	3	Foreign Lang.	3	(if necessary)	0-3	Sociol. 1	3
Phys. Ed.	1	Phys. Ed. 2	1	Electives	3-9	Electives	3-9
Elective	3	Elective	3				
	17		17		15-18		15-18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Geog. 261	3	Geog. 140	3	Geog. 210	3	Geog. 219	3
Hist. 52	3	Geog. 202	3	Electives	13	Geog. 220	3
Sociol. 2 or 51	3	Electives	10			Electives	10
Electives	7						
	16		16		16		16

Courses of Instruction in Geography

Lower Division

1. **Introduction to Geography.** I, II. 3 hr. Basic principles of the discipline, including maps, climate, physiographic, urban, political and cultural geography. Not open to students who have completed either Geog. 7 or 8.

7. **Physical Geography.** I, II. 3 hr. Study of earth's physical regions as modified and classified by man.

8. **Human Geography.** I, II. 3 hr. Study of land use and settlement patterns resulting from man's occupying the earth, problems of race, minorities, economic development and population growth.

Upper Division

105. **Geography of Natural Resources.** II. 3 hr. Distributions of the natural resources in the United States and the factors involved in resource-development, planning of multi-functional land-use, and pollution control and abatement.

107. **Weather and Climate.** II. 3 hr. Processes of weather and patterns of climate and their significance to man.

109. **Economic Geography.** I, II. 3 hr. Earth's land use patterns and interactions that result from man's economic activities. Includes the analysis of industrial location, mineral exploitation, and agricultural patterns.

140. **Geography of Anglo-America.** I. 3 hr. Regional characteristics and problems of development.

141. **Geography of Western Europe.** I. 3 hr. Regional characteristics, problems of development, and human ecology of the area.

202. **Political Geography.** I. 3 hr. PR: Consent. Examination of spatial interrelationship of man and his environment in a political setting; population, developmental, and boundary problems.

203. **Historical Geography of Anglo-America.** II. 3 hr. Exploration, settlements, and changing patterns of human occupance from the sixteenth century to the present; cultural areas and their significance.

210. **Urban Geography.** II. 3 hr. Location, development and change of urban land use patterns, urban spatial structures and contemporary urban problems.

219. **Problems in Geography.** I, II. 3 hr. PR: Consent.

220. **Seminar in Geography.** I, II. 3 hr. (Max. 12 hr.)

240. **Geography of U.S.S.R. and Eastern Europe.** II. 3 hr. Analysis of the physical environment, human resources, and economic utilization of the region.

246. **Geography of Africa.** II. 3 hr. Systematic and regional characteristics and geographic problems of political, social, and economic development.

261. **Cartography.** I. 3 hr. Theory and practice of map design.

HISTORY

Faculty

William T. Doherty, Jr., Ph.D. (U. Mo.), *Chairman and Professor.*
William S. Arnett, M.A. (Ohio St. U.), *Instructor.*
Wesley M. Bagby, Ph.D. (Columbia U.), *Professor.*
William D. Barns, Ph.D. (WVU), *Associate Professor.*
Charles V. Bias, M.A. (Marshall U.), *Instructor (part-time).*
John A. Caruso, Ph.D. (WVU), *Professor.*
Elizabeth Cometti, Ph.D. (U. Va.), *Professor Emeritus.*

Charles W. Connell, Ph.D. (Rutgers U.), *Associate Professor.*
Jason C. Easton, Ph.D. (U. Wisc.), *Professor Emeritus.*
Harry D. Fox, M.A. (Ind. U., Pa.), *Instructor (part-time).*
Jack L. Hammersmith, Ph.D. (U. Va.), *Assistant Professor.*
Ruth M. Hicks, M.A. (U. Ill.), *Lecturer.*
James F. Hilgenberg, M.A. (U. S.D.), *Instructor (part-time).*
Elizabeth K. Hudson, Ph.D. (Ind. U.), *Associate Professor.*
Carl M. Hunt, M.A. (WVU), *Instructor (part-time).*
Daniel C. Jones, M.A. (WVU), *Instructor (part-time).*
James W. Kershner, M.A. (WVU), *Instructor (part-time).*
Michael Lechnar, M.A. (WVU), *Instructor (part-time).*
Mortimer Levine, Ph.D. (U. Penn.), *Professor.*
James E. McGoldrick, M.A. (Temple U.), *Instructor (part-time).*
William R. McLeod, Ph.D. (U. Md.), *Assistant Professor.*
Kenneth R. MacDonald, M.A. (WVU), *Instructor (part-time).*
Robert M. Maxon, Ph.D. (Syracuse U.), *Assistant Professor.*
John A. Maxwell, Ph.D. (WVU), *Assistant Professor.*
Dennis H. O'Brien, M.A. (Cornell U.), *Assistant Professor.*
George P. Parkinson, Jr., Ph.D. (U. Wisc.), *Assistant Professor; Curator, West Virginia Collection.*
Kurt Rosenbaum, Ph.D. (Syracuse U.), *Professor.*
Douglas C. Smith, M.A. (Appalachian St. U.), *Instructor (part-time).*
Sara R. Smith, Ph.D. (Columbia U.), *Associate Professor Emeritus.*
Michael R. Sponberg, M.A. (U. N.D.), *Instructor (part-time).*
Edward M. Steel, Jr., Ph.D. (U. N.C.), *Professor.*
John A. Williams, Jr., Ph.D. (Yale U.), *Associate Professor.*

Requirements

History majors are required to complete 12 hours in lower-division history, 18 hours in upper-division history, and 6 hours each in the related fields of economics and political science. History majors also are required to complete a minor of 9-12 upper division hours in a related subject. Of the required 18 hours in upper-division history courses at the 100 and 200 course levels, majors should divide their course selections between American and non-American fields within Groups II and III. With the approval of his adviser and the Chairman of the Department, he may elect options at the 300 course level.

SUGGESTED SCHEDULE FOR A.B. DEGREE WITH MAJOR IN HISTORY

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Foreign Lang.		Foreign Lang.	
Foreign Lang.	3	Foreign Lang.	3	(if necessary)	3	(if necessary)	3
Group A	3-4	Group A	3-4	Group A	2-3	Group A	2-3
Group C	3-4	Group C	3-4	Group C	3-4	Group C	3-4
Phys. Ed. 1	1	Phys. Ed. 2	1	Hist. 52	3	(if necessary to	
Hist. 1 or 2	3	Hist. 2 or 3	3	Econ. 51	3	fulfill Core	
				Pol. Sci. 1	3	Curriculum	
						requirements)	
						Hist. 53	3
						Econ. 52	3
						Pol. Sci. 2	3
	16-18		16-18		17-19		17-19

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
History (from Groups II and III)	6	History (from Groups II and III)	6	History	3-6	History	3-6
Minor	3	Minor	3	Minor	3	Minor	3
Electives	6-9	Electives	6-9	Electives	9	Electives	9
	15-18		15-18		15-18		15-18

Group I. Hist. 1, 2, 3, 52, 53.

Group II. Hist. 101, 103, 105, 107, 109, 117, 118, 119, 120, 121, 141, 142, 201, 202, 205, 206, 209, 210, 213, 214, 215, 216, 217, 218, 222, 225, 226, 229, 230, 241, 242.

Group III. Hist. 151, 153, 155, 157, 159, 161, 251, 252, 253, 255, 257, 259, 261, 263, 264, 266, 267, 268, 269, 271, 272.

Courses of Instruction in History

Professors Doherty (*Chairman*), Bagby, Caruso, Levine, Rosenbaum, and Steel; Associate Professors Barns, Connell, Hudson, and Williams; Assistant Professors Hammersmith, McLeod, Maxon, Maxwell, O'Brien, and Parkinson; Instructor Arnett; Lecturer Hicks.

Lower Division

1. **Western Civilization: Ancient Times Through the Middle Ages.** 3 hr.
2. **Western Civilization: Renaissance to Congress of Vienna.** 3 hr.
3. **Western Civilization: Since Napoleon.** 3 hr.
52. **Growth of the American Nation to 1865.** 3 hr.
53. **Making of Modern America: 1865 to the Present.** 3 hr.

Upper Division

101. **History of Ancient Times: Stone Age to the Fall of Rome.** 3 hr.
103. **Medieval Europe: Fall of Rome to the Renaissance.** 3 hr.
105. **Early Modern Europe: Renaissance to the Enlightenment.** 3 hr.
107. **Revolutionary Europe.** 3 hr.
109. **Twentieth Century Europe.** 3 hr.
117. **History of Russia: From Kiev to Nicholas I.** 3 hr.
118. **History of Russia: From the Emancipation to the Present.** 3 hr.
119. **British Civilization to 1660.** 3 hr.
120. **British Civilization Since 1660.** 3 hr.
121. **History of Modern Germany.** 3 hr.
141. **Latin American History: Colonial Period and the Wars of Independence.** 3 hr.

142. Latin America Since 1824. 3 hr.

151. The United States and Pennsylvania. 3 hr.

153. West Virginia. 3 hr.

155. The American Colonial and Revolutionary Experience. 3 hr.

157. The Early Republic: United States 1781 to 1861. 3 hr.

159. The United States: 1865-1918. 3 hr.

161. Recent America: United States Since 1918. 3 hr.

201. Social and Economic History of the Middle Ages: 300-1000. 3 hr.

202. Social and Economic History of the Middle Ages: 1000-1500. 3 hr.

205. The Renaissance. 3 hr.

206. The Reformation. 3 hr.

209. The ABC Powers of Latin America. 3 hr.

210. Modern Spain. 3 hr.

213. Bourbon France. 3 hr.

214. The Revolutionary-Napoleonic Era. 3 hr.

215. European Diplomatic History: 1815 to 1919. 3 hr.

216. European Diplomatic History: 1919 to Present. 3 hr.

217. Diplomatic History of the U.S.S.R.: 1917 to 1939. 3 hr.

218. Diplomatic History of the U.S.S.R.: 1939 to Present. 3 hr.

222. Twentieth Century Germany from Weimar to Bonn. 3 hr.

225. History of Modern China. 3 hr.

226. History of Modern Japan. 3 hr.

229. History of Africa: Pre-Colonial. 3 hr.

230. History of Africa: European Dominance to Independence. 3 hr.

241. English Social History: 14th to 18th Century. 3 hr.

242. English Social History: 18th Century to the Present. 3 hr.

251. History of Black People in America to 1900. 3 hr.

252. History of Black People in America Since 1900. 3 hr.

253. Civil War and Reconstruction. 3 hr.

255. The Cleveland Era. 3 hr.

257. The U.S. From McKinley to the New Deal: 1896 to 1933. 3 hr.

259. Recent American History: 1933 to Present. 3 hr.

261. Economic and Social Development of West Virginia. 3 hr.

263. **American Diplomacy to 1918.** 3 hr.

264. **American Foreign Policy and Diplomacy: 1918 to the Present.** 3 hr.

266. **American Economic History to 1865.** 3 hr.

267. **American Economic History Since 1865.** 3 hr.

268. **The Old South.** 3 hr.

269. **The New South.** 3 hr.

271. **American Frontier East of the Mississippi.** 3 hr.

272. **American Frontier West of the Mississippi.** 3 hr.

301. **Readings in Medieval History.** 3-6 hr.

305. **Readings in English History.** 3-6 hr.

309. **Readings in Central European History.** 3-6 hr.

313. **Readings in Eastern European History.** 3-6 hr.

317. **Readings in Western European History.** 3-6 hr.

321. **Readings in Asian History.** 3-6 hr.

325. **Readings in African History.** 3-6 hr.

351. **Readings in American History: 1492-1789.** 3-6 hr.

355. **Readings in American History: 1763-1865.** 3-6 hr.

359. **Readings in American History: 1850-1898.** 3-6 hr.

363. **Readings in American History: 1898 to Present.** 3-6 hr.

367. **Readings in Frontier History.** 3-6 hr.

373. **Readings in Local and Regional History.** 3-6 hr.

377. **European Cultural and Intellectual History.** 3 hr.

378. **European Cultural and Intellectual History.** 3 hr.

381. **Intellectual and Social History of the U.S. to 1876.** 3 hr.

382. **Intellectual and Social History of the U.S. Since 1876.** 3 hr.

391. **American Labor Movement.** 3 hr.

392. **History of American Agriculture.** 3 hr.

HUMANITIES PROGRAM

Manfred O. Meitzen, Ph.D. (Harvard U.), *Chairman of Humanities and Professor of Religious Studies.*

The cultural tours (Humanities 250, 260, 270, 280) are offered during the summer only, according to demand. They are primarily intended for students of art, humanities, literature, and related fields.

Courses of Instruction in Humanities Program

Lower Division

1, 2. **Introductory General Course.** I, II. 3 hr. per sem. The first semester of this course examines problems of philosophy and religion as seen through a group of great authors from Plato to the present, including Sophocles, Dante, Machiavelli, and Voltaire, stressing the recurrence of these problems and their relevance today. The second semester deals with the realms of art and science, treating various problems of creativity in our modern technological society. Each student attends a discussion group limited to about twenty participants.

3, 4. **Seminar.** I, II. 1 hr. per sem. Honors course for selected students already in Humanities 1 and 2. Affords participants a wider opportunity for discussion than in Humanities 1 and 2, and the chance to earn extra credit.

Upper Division

141. **Great Books. (First Course).** I. 3 hr. This course considers a group of literary masterpieces in translation by such writers as Plato, Dante, Cervantes, and Goet' e. Taken separately and in order, they represent the Greek world, the Middle Ages, the Renaissance, and the Modern period. Taken as a group, they illustrate the persistent conflict between the actual and the ideal in the literature of Western Civilization.

142. **Great Books. (Second Course).** II. 3 hr. This course considers five literary masterpieces of which four are in translation: Marcus Aurelius' *Meditations,* Benvenuto Cellini's *Memoirs,* Montaigne's *Essays,* Rousseau's *Confessions,* and *The Education of Henry Adams.* These personal evaluations of the problems of life, ranging from the Roman Empire to modern America, constitute the integrating principle of the course.

181, 182. **American Civilization.** I, II. 3 hr. per sem. The salient characteristics of American civilization as they have developed since the planting of European colonies on this continent. Emphasis on the unique contributions of successive arrivals on American shores to the making of the distinctive American culture, as evidenced in its folkways, arts, and philosophy. The central theme of the course is the manifestation of the democratic spirit in the thought and feelings of the American people.

250. **Culture Tour of Europe.** S. 6 hr. PR: Some cultural background in European civilization such as Humanities 1, 2, Hist. 1, 2, art survey courses, or equiv., or consent.

260. **Culture Tour of Latin America.** S. 6 hr. PR: Some cultural or historical background in Latin America, such as history or art courses, or consent.

270. **Cradle of History Tour of the Near East.** S. 6 hr. PR: Humanities 1, 2, Hist. 1, 2, or equiv., or consent.

280. **Around-the-World Culture Tour.** S. 6 hr. PR: A course in world or western civilization, such as Humanities 1, 2, Hist. 1, 2, or consent.

LIBRARY SCIENCE

Faculty

Robert F. Munn, Ph.D. (U. Mich.), *Chairman and Professor; Director of Libraries.*
Stokely B. Gribble, M.S.L.S. (U. Ky.), *Assistant Professor; Assistant Director of Libraries.*
Clifford C. Hamrick, M.L.S. (Rutgers U.), *Assistant Professor; Chief Reference Librarian.*
Theodore M. Judy, M.A.L.S. (WVU), *Assistant Professor; Physical Science Librarian.*
George D. Kiley, M.L.S. (SUNY, Albany), *Assistant Professor; Chief Circulation Librarian.*
Evelyn M. Kocher, M.S.L.S. (U. N.C.), *Asssistant Professor; Chief Catalog Librarian.*
Victorine A. Louistall, M.A.L.S. (WVU), *Assistant Professor.*
Barbara J. Mertins, M.S.L.S. (Syracuse U.), *Assistant Professor.*
Mildred I. Moyers, M.S.L.S. (West. Res. U.), *Assistant Professor; Chief Acquisition Librarian.*

Program

Courses in undergraduate library science are designed for students preparing to qualify for state certification as teacher-librarians in public schools, students who desire a general program in library science, and students who are interested in preparing for graduate study in librarianship. A student planning to serve as a school librarian must complete the minimum number of hours of education courses required for certification. Students wishing to enter other fields of library science should plan their programs to include appropriate courses.

CURRICULUM FOR A.B. DEGREE WITH MAJOR IN LIBRARY SCIENCE

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	English 21	3	English 22	3
Foreign Lang.	3	Foreign Lang.	3	Foreign Lang.	3	Foreign Lang.	3
Lab. Sci.	4	Lab. Sci.	4	Soc. Sci. or		Soc. Sci. or	
Lib. Sci. 1	3	Electives	5-7	Pol. Sci.	4	Pol. Sci.	4
Electives	4	Phys. Ed. 2	1	Lib. Sci. 201	3	Electives	7
Phys. Ed. 1	1			Electives	4		
	18		16-18		17		17

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Lib. Sci. 223	3	Lib. Sci. 224	3	Lib. Sci. 222	3	Electives	18
Humanities 141	3	Humanities 142	3	Electives	15		
Electives	12	Electives	12				
	18		18		18		18

Required courses: Lib. Sci. 201, 203, 205, 222, 223.
Recommended electives: Lib. Sci. 1, 207, 224, 235, 326, 327, 330.

Courses of Instruction in Library Science

Professor Munn (*Chairman*); Assistant Professors Gribble, Hamrick, Judy, Kiley, Kocher, Louistall, Mertins, and Moyers.

Lib. Sci.

1. **Using Books and Libraries.** I, II, S. 3 hr. Planned to give working knowledge of library facilities, particularly of the University Library. General reference sources, basic principles of cataloging, and departments of the library are studied. A course that is useful to any student in the University.

201.° **Reference and Bibliography.** I, II, S. 3 hr. PR: Consent. Basic reference books, dictionaries, encyclopedias, indexes, yearbooks, and other reference materials are studied and evaluated, with emphasis on the theory and practical experience of reference books. Required for Library Science majors.

203.° **Library Materials for Children.** I, II, S. 3 hr. Survey of children's literature in the light of historical development, with emphasis on current trends. Consideration of the criteria for and means of evaluating print and nonprint materials for support of the curriculum, recreation and child guidance.

205.° **Selection of Books and Related Materials for the Secondary School Library.** I, S. 3 hr. Survey of adolescent literature and other library materials adapted to the needs of junior and senior high school students.

207.° **Organization and Administration of the Instructional Materials Center in the Secondary School.** I, S. 3 hr. PR: Lib. Sci. 205, 223. For school librarians. Study of organization and administration, including planning, equipment, routines, and schedules, and the role of the librarian in the instructional program.

222.° **Field Practice.** I, II, S. 3 hr. PR: Lib. Sci. 201, 203, 205, 207, or 235, 223. Practical experience in a variety of public, school, and special libraries, and instructional materials centers, under the supervision of experienced librarians and media specialists. 100 clock hours must be completed by the student.

223.° **Cataloging and Classification.** I, II, S. 3 hr. Basic principles and problems of cataloging and classification combined with practical experience in processing the various types of books and materials. Problems peculiar to the teacher-librarian considered.

224. **History of Books and Libraries.** I, S. 3 hr. A survey course, including the development of the book from early manuscript form, history of printing, book illustration, bindings, and the library and its development.

235.° **Organization and Administration of the Instructional Materials Center in the Elementary School.** II, S. 3 hr. PR: Lib. Sci. 223. For school librarians. Includes planning quarters, selection, acquisition and organization of books and other materials, supervision of library assistants, relations with faculty, administration, and community.

326. **Literature of the Social Sciences.** I, S. 3 hr. PR: Consent. Bibliographic and reference sources in the social sciences. Course designed to give the student a good working knowledge of the major sources of information in the social sciences and the ability to make effective use of the library.

°Presently required for certification in the State of West Virginia.

327. **Literature of the Humanities.** I, S. 3 hr. Bibliographic and other reference sources in the major subject areas of the humanities, including religion, philosophy, fine arts, music, and literature.

328. **Literature of Science and Technology.** II, S. 3 hr. PR: Consent. Designed to give the student a good working knowledge of the increasingly complex literature of science and technology.

330. **Library Resources for the School Curriculum.** II. 3 hr. Broadened experiences in both library and outside resources that lend themselves to curriculum enrichment, including guidance, remedial reading, textbooks, community resources, all phases of audio-visuals, etc. Presented to elementary and secondary teachers as well as librarians to help them give more effective services.

MATHEMATICS

Faculty

Iland D. Peters, M.S. (WVU), *Chairman and Professor.*
Oleg Carleton, Ph.D. (U. Calif., Santa Barbara), *Instructor.*
Anand M. Chak, Ph.D. (Lucknow U., India), *Associate Professor.*
Jean M. Coover, M.A. (WVU), *Instructor.*
Allen B. Cunningham, Ph.D. (WVU), *Professor.*
Hannibal A. Davis, Ph.D. (Cornell U.), *Professor Emeritus.*
Judith S. Denton, M.A. (Columbia U.), *Instructor.*
James B. Derr, Ph.D. (Mich. St. U.), *Assistant Professor.*
James R. Dosier, M.S. (Temple U.), *Assistant Professor.*
James E. Dowdy, Ph.D. (Okla. St. U.), *Assistant Professor.*
Joy B. Easton, M.S. (WVU), *Assistant Professor.*
James C. Eaves, Ph.D. (U. N. C.), *Centennial Professor.*
Judith A. Gibbs, M.A. (WVU), *Instructor.*
Helen L. Godfrey, M.S. (WVU), *Instructor.*
Jack T. Goodykoontz, Ph.D. (U. Ky.), *Instructor.*
Henry W. Gould, M.A. (U. Va.), *Professor.*
David C. Haddad, Ph.D. (Purdue U.), *Assistant Professor.*
Judith C. Hall, M.S. (Harvard U.), *Instructor.*
Lois V. Heflin, M.S. (WVU), *Instructor.*
Dora F. Hennen, M.S. (WVU), *Instructor.*
D. Michael Henry, Ph.D. (TCU), *Assistant Professor.*
Franz X. Hiergeist, Ph.D. (U. Pitt.), *Associate Professor.*
Caulton L. Irwin, Ph.D. (Emory U.), *Assistant Professor.*
Alonzo F. Johnson, Ed.D. (Okla. St. U.), *Associate Professor.*
Jin B. Kim, Ph.D. (VPI), *Associate Professor.*
Isaac E. Leonard, Ph.D. (Carnegie-Mellon U.), *Instructor.*
Wilma J. Loudin, M.S. (WVU), *Instructor.*
Betty L. Miller, M.S. (WVU), *Assistant Professor.*
James E. Miller, Ph.D. (U. Ky.), *Assistant Professor.*
Narayan P. Mukherjee, Ph.D. (Mich. St. U.), *Assistant Professor.*
John W. Randolph, Ph.D. (U. Va.), *Associate Professor.*
Mildred F. Russell, M.A. (WVU), *Instructor.*
Donald F. Reynolds, Ph.D. (TCU), *Assistant Professor.*
John W. Schleusner, Ph.D. (U. Ala.), *Assistant Professor.*
William H. Simons, Ph.D. (Carnegie-Mellon U.), *Assistant Professor.*
Joseph K. Stewart, Ph.D. (WVU), *Professor Emeritus.*
Charles H. Vehse, Ph.D. (Brown U.), *Professor Emeritus.*
Marvin L. Vest, Ph.D. (U. Mich.), *Professor.*

Programs

The Department of Mathematics provides a curriculum which contains programs for an undergraduate major in mathematics, for the pre-service elementary and secondary teacher, for the student who is interested in the applications of mathematics to the fields of computer science; statistics; engineering; physical, natural and social science; and commerce. Also included in the curriculum are courses designed to acquaint the non-science major with the ideals and objectives of mathematics.

The Department cooperates with other college and University units in maintaining in its curriculum courses relevant to the needs of their students.

The first concern of any student majoring in mathematics should be the development of careful habits of thought. Indeed, the value of a major in mathematics ultimately rests on its capacity to train the mind to logical patterns of behavior. This experience insures the relevance of studies of mathematics to any rational endeavor.

Freshmen and sophomores who plan to major in mathematics and who also wish to meet the requirements for certification as secondary teachers of mathematics should plan their programs carefully in order to meet both sets of requirements within the four academic years.

Students who expect to major in mathematics should maintain a grade-point average of not less than 2.5 in lower-division mathematics course-work.

Placement examinations for freshmen will be given during the summer Orientation Program and just prior to registration for the First Semester of the academic year. The Department, on request from a high school principal, will provide placement test service at the high school during the latter part of the Second Semester for interested graduating seniors.

Entering students also may be placed on the basis of scores made on Advanced Placement Examinations (College Entrance Examination Board) and ACT scores.

Students who are registered at the University may earn credit for a number of mathematics courses by examination. Examinations will be given at two separate times during each semester. Information concerning the regulations pertaining to credit by examination, courses listed, where and when to apply, time and place of examinations may be obtained from the Academic Advising Center.

SUGGESTED MATHEMATICS PROGRAM

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Foreign Lang.	3	Foreign Lang.	3
Foreign Lang.	3	Foreign Lang.	3	Math. 51	4	Math. 163	3
Math. 15	4	Math. 16	4	Elective Core		Elective Core	
Phys. Ed. 1	1	Phys. Ed. 2	1	Group C	4-5	Group C	4-5
Electives Core		Electives Core		Elective Core		Electives Core	
Gp. A or B	3-6	Gp. A or B	3-6	Gp. A or B	3-6	Gp. A or B	3-7
	16-17		16-17		17-18		17-18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Math. 141	3	Math. 241	3	Math. 251	3	Math. 252	3
Math. 181	3	Math. elective	3	Math. elective	3	Math. elective	3
Elective Core Gp. A or B	0-3	Elective Core Gp. A or B	0-3	Electives	9	Electives	9
Electives	6-9	Electives	6-9				
	15-18		15-18		15		15

Required Courses: Math. 3 and 4 or 14, if student does not have equivalent preparation upon entering into the program; 15, 16, 51, 141, 163, 181, 241, 251, 252.

Recommended electives: 9 hr., including at least one course in geometry or number theory; Math. 113, 161, 168, 215, 239, 256, 261, 263, 269, 271, 291-292.

Courses of Instruction in Mathematics

Professors Peters (*Chairman*), Cunningham, Eaves, Gould, and Vest; Associate Professors Chak, Hiergeist, Johnson, Kim, and Randolph; Assistant Professors Derr, Dosier, Dowdy, Easton, Haddad, Henry, Irwin, B. Miller, J. Miller, Mukherjee, Reynolds, Schleusner, and Simons; Instructors Carleton, Coover, Denton, Gibbs, Godfrey, Goodykoontz, Hall, Heflin, Hennen, Leonard, Loudin, and Russell.

Math.

Pre-College

0. **Elementary Algebra.** I and II. ½ unit per sem. A two-semester course equivalent to first-year high school algebra. This course is offered to enable students to remove entrance conditions in mathematics. This course carries no University credit, although it is considered equivalent to three hours per semester in calculating student course loads. Self-instruction programmed course materials are available on a rental basis.

1. **Geometry.** I and II. ½ unit per sem. A two-semester course covering the usual material of high school plane and solid geometry. This course is offered to enable students to remove entrance conditions in mathematics. This course carries no University credit, although it is considered equivalent to three hours per semester in calculating student course loads. Self-instruction programmed course materials are available on a rental basis.

2. **Algebra.** I, II. 3 hr. PR: 1 unit algebra. Credits earned in Math. 2 are not counted in the 128 hours required for graduation by the College of Arts and Sciences.

Lower Division

3. **College Algebra.** I, II. 3 hr. PR: 1½ units algebra or Math. 2, and 1 unit geometry. Not open to students who have credit for the equivalent of Math. 14.

4. **Plane Trigonometry.** I, II. 3 hr. PR: 1½ units algebra or Math. 2, and 1 unit geometry. Not open to students who have credit for the equivalent of Math. 14.

14. **Pre-Calculus Mathematics.** I, II. 4 hr. PR: 2 units algebra and 1 unit geometry. A treatment of algebra, analytic geometry, and trigonometry necessary for the study of calculus. Not open to students who have credit for the equivalent of either Math. 3 or Math. 4.

15, 16. **Single Variable Calculus I and Single Variable Calculus II.** I, II. 4 hr. per sem. PR: 2 units algebra, ½ unit trigonometry, or Math. 3 & 4, or Math. 14. An introduction to plane analytic geometry including vectors, and an intuitive but thorough development of the calculus of one variable including infinite series and the solution of some basic differential equations.

17. **Applied Mathematics I.** I, II. 4 hr. PR: Math. 16. Primarily for engineers and scientists. Linear algebra, vectors, matrices; linear and non-linear, ordinary differential equations; applications to physics and engineering.

18. **Applied Mathematics 2.** I, II. 4 hr. PR: Math. 17. Primarily for engineers and scientists. Calculus of several variables, complex variables and conformed maps; probability, errors and variance, elementary statistics; numerical analysis, solutions of algebraic and differential equations; applications to boundary value problems in engineering and physics.

21, 22. **Introduction to Mathematics.** I, II. 2 hr. per sem. PR: 1 unit algebra. Course is designed for students who are not science or mathematics majors, and who do not need the techniques of mathematics for other course work in their programs. Reasoning, development of elementary mathematics, function and limit concepts, topics in modern mathematics, the nature of mathematics and its relation to modern civilization.

28. **Finite Mathematics.** I, II. 3 hr. PR: Two years high school algebra or Math. 3. Logic, sets, partitions, probability theory, vectors, matrices, linear programming and applications in commerce.

33, 34. **Introductory Mathematics for Elementary Teachers.** I, II. 3 hr. per sem. PR: One unit high school algebra. For elementary education majors. Structure of the number systems; techniques of arithmetic computation derived from the properties of the real number system; informal geometry.

51. **Multivariables Calculus.** I, II. 4 hr. PR: Math. 16. An introduction to solid analytic geometry, the calculus of several variables; and introduction to differential equations.

Upper Division

113. **Differential Equations.** I, II. 3 hr. PR: Math. 18 or 51. Analysis of ordinary differential equations including: existence and uniqueness of solutions; methods of solution; oscillatory, stability and asymptotic properties of solutions; boundary value problems, linear and non-linear systems.

116. **Introduction to the Laplace Transform.** II. 3 hr. PR: Math. 18 or 51. Introduction at the undergraduate level to the theory and application of the Laplace transform.

121. **Digital Computer Programming.** I, II. 1 hr. PR: Math. 3. Preparation and execution of FORTRAN computer programs.

123. **Introduction to Numerical Procedures.** I or II. 3 hr. PR: Math. 16 or consent. Course is intended for those students who are interested in immediate applications and do not intend to pursue further studies in numerical analysis.

Finite differences, zeros of polynomials, interpolation and approximation, linear equations, least squares, quadrature, numerical methods for ordinary differential equations. (Equiv. to Comp. Sci. 120.)

125. **Theory of Games.** II. 3 hr. PR: Math. 16 or consent. Elements of matrix algebra and probability. Theory of games, including decision theory, linear and dynamic programming, and strategy.

131. **Structure of the Real Numbers.** I, II. 3 hr. PR: One year each of high school algebra and geometry, Math. 34. For elementary education majors. This course is designed especially for preservice elementary mathematics teachers. Other students may be admitted if departmental approval is obtained prior to registration. The real numbers as a complete ordered field and its subsystems. Linear and quadratic equations and inequalities, modular arithmetic, functions, matrices, complex numbers, and algebraic structures.

132. **Informal Geometry for Elementary Teachers.** I, II. 3 hr. PR: One year each of high school algebra and geometry, Math. 131, or consent. Logic, finite geometries, and an informal approach to the concepts of congruence, similarity, parallelism, measure, symmetry, symmetry groups, and coordinate geometry as related to Euclidean geometry. This course is designed especially for preservice elementary mathematics teachers. Other students may be admitted if departmental approval is obtained prior to registration.

133. **Introductory Modern Algebra for Teachers.** I, II. 3 hr. PR: Calculus or consent. Not open to students with credit for Mathematics 141. The basic number systems, decomposition of integers, modular systems, groups, rings, domains, fields, polynomial rings, matrices, vector spaces, linear transformations.

138. **Modern Geometry for Teachers.** I. 3 hr. PR: Math. 16 or consent. For high school teachers. Course is designed especially for prospective high school mathematics teachers. Other students may be admitted if departmental approval is obtained prior to registration. Foundations of geometry. Special topics from Euclidean, projective, and non-Euclidean geometries.

141. **Introduction to Algebraic Structures.** I, II. 3 hr. PR: Math. 163 or consent. A study of groups, rings, and fields together with their substructures, quotients and products, morphisms; the fundamental homomorphism theorems.

161. **Mathematical Logic I.** I. 3 hr. PR: Phil. 2, or Math. 15, or consent. The logic of statements, relations and identity; introduction to the notions of consistency, completeness and decidability. (Equiv. to Phil. 106.)

163. **Introduction to the Concepts of Mathematics.** I, II. 3 hr. PR: Math. 16 or consent. Elementary predicate calculus, quantifiers, free and bound variables. Naive set theory, the algebra of sets, relations, and functions, algebra of relations; order and equivalence relations, decompositions of sets. Lattices, the isotone fixed-point theorem for complete lattices; the Cantor-Schroeder-Bernstein theorem. Cardinal numbers.

168. **History of Mathematics.** II. 3 hr. PR: Math. 15. Survey of the development of mathematics through the calculus, with emphasis on the mathematical theories and techniques of each period and their historical evolution.

181. **Topology.** I, II, S. 3 hr. PR: Math. 163 or consent. A study of metric and other topological spaces. Open and closed sets, generation of topologies, equivalence of metrics, subspaces, quotient and product spaces, separation, continuity, compactness, connectedness, applications to the real line. Completion of metric spaces; countability axioms, sequential convergences; function spaces, pointwise and uniform convergence.

214. **Vector Analysis.** I, II. 3 hr. PR: Math. 18. Primarily for engineers and scientists. Vector algebra, differential operators, curvilinear coordinate systems, Stokes' and Gauss' theorems, applications, linear systems of equations, matrices, determinants, quadratic forms, eigenvalues and canonical forms, and numerical inversions.

215. **Applied Modern Algebra.** II. 3 hr. PR: Consent. For advanced undergraduates and beginning graduate students in mathematics, computer science and technology. Introduction to graph theory, Boolean algebras, monoids, finite-state and Turing machines with applications to computer design, algebraic coding theory and computer language, especially ALGOL.

219. **Seminar in Applied Mathematics.** I, II. 1-12 hr.

226. **Mathematical Statistics.** II. 3 hr. PR: Math. 18 or 51. Discrete and continuous variables, correlation, regression, sampling theory, normal, chi-square, t, and F distributions; significance tests; analysis of variance.

231, 232. **Introduction to Mathematics for the Elementary Teacher.** I, II. 3 hr. per sem. PR: Math. 33, 34, or consent. Not open to students who have credit for Math. 131, 132. Course is designed especially for inservice elementary mathematics teachers. Other students may be admitted if departmental approval is obtained prior to registration. Systems of numeration; sets, relations, binary operations, decimal and other base systems; natural numbers, integers, rational numbers, and real numbers with emphasis on the algebraic structure of each; the notions of length, area, and volume: Pythagorean theorem; and coordinate geometry.

239. **Elementary Number Theory.** II, S. 3 hr. PR: Math. 16 or Math. 131 or consent. A study of divisibility, congruences, linear and quadratic diophantine equations, number theoretic functions, and applications of number theory to other areas of mathematics.

241. **Introduction to Linear Algebra.** I, II. 3 hr. PR: Math. 163 or consent. A study of vector spaces, subspaces, quotient spaces, direct sums, linear transformations, fundamental isomorphism theorems, matrix representations, dual spaces, canonical forms. Multilinear algebra (i.e. bi-linear functions, determinants).

251, 252. **Introduction to Real Analysis.** I, II. 3 hr. per sem. PR: Math. 163 or consent. A study of sequences, convergence, limits, continuity, definite integral, the derivative, differentials, functional dependence, multiple integrals, sequences and series of functions.

255. **Advanced Real Calculus.** S. 3 hr. PR: Math. 51 or consent. Limits, series, metric spaces, uniformity, integrals.

256. **Complex Variables.** II. 3 hr. PR: Math. 18 or 51. Complex numbers, functions of a complex variable; analytic functions; the logarithm and related functions; power series; Laurent series and residues; conformal mapping and applications.

261. **Mathematical Logic II.** II. 3 hr. PR: Phil. 106 or Math. 161 or consent. A more formal and rigorous approach to the material covered in Phil. 106; selected problems in the philosophy of mathematics and the philosophy of logic. (Equiv. to Phil. 206.)

263. **Pro-seminar.** I, II, S. 3 hr. PR: Consent. An introduction to the foundations of mathematics via axiomatic set theory and cardinal and ordinal numbers, with emphasis on applications to other parts of mathematics.

265. **Introduction to Metamathematics I.** I. 3 hr. PR: Consent. Survey of the methodology of the deductive sciences with emphasis on the theory of proof and effective operations therein.

266. **Introduction to Metamathematics II.** II. 3 hr. PR: Math. 265. Course deals with recursive function theory. Godel's proof and associated results.

269. **Advanced Topics in Mathematics.** I, II, S. 3-9 hr. PR: Consent. An independent but directed study program, the content of which is to be mutually agreed upon by the individual student and instructor.

271. **Projective Geometry.** II. 3 hr. PR: Math. 141, 241, or consent. Projective and affine spaces, transformation groups for planes. Introduction to axiomatic plane geometries.

291, 292. **Theory of Probability.** I, II. 3 hr. per sem. PR: Math. 18 or 51. Fundamental theorems. Development of density and distribution functions in the discrete and continuous cases. Classical problems and solutions. Moments, characteristics functions, limit theorems. Applications.

PHILOSOPHY

Faculty

Ralph W. Clark, Ph.D. (U. Colo.), *Assistant Professor.*
John R. Cresswell, Ph.D. (Cornell U.), *Professor Emeritus.*
Gene A. D'Amour, Ph.D. (U. Minn.), *Assistant Professor.*
Theodore M. Drange, Ph.D. (Cornell U.), *Associate Professor.*
William S. Haymond, Ph.D. (St. Louis U.), *Professor.*
Patricia S. Long, M.A. (WVU), *Instructor (part-time).*

Program

The four lower-division courses in philosophy (Phil. 1, 2, 3, 4) are recommended for all students. They are designed to help the student learn how to think and reason properly, and to provide him with an understanding and appreciation of the most profound and challenging problems ever to confront man's intellect.

The major curriculum in philosophy is desgined to enable students to do more concentrated work in the field. It would either prepare them for eventual graduate work in philosophy after obtaining the bachelor's degree at WVU or allow them to pursue their special philosophical interests as an undergraduate (or both).

Required courses: 36 hr. of Philosophy. Majors must earn at least a C in each of following nine courses: Phil. 1, 3, 101, 102, 106, 108, 171, 103 or 115; 166 or 172 or 206.

Courses of Instruction in Philosophy

Professor Haymond; Associate Professor Drange; Assistant Professors Clark and D'Amour; Instructor Long.

Phil.

Lower Division

1. **Introduction to Logic I.** I and II. 3 hr. A study of nonformal techniques useful for analyzing sentences and evaluating arguments in both ordinary and scientific discourse.

2. **Introduction to Logic II.** I and II. 3 hr. Syllogistic logic and elementary symbolic logic.

3. **Introduction to Philosophy.** I and II. 3 hr. A study of basic problems associated with such topics as free-will, God, immortality, mind and body, social values, linguistic analysis, and knowledge.

4. **Introduction to Ethics.** I or II. 3 hr. Consideration of answers to questions such as, How ought we live? What type of life is best? What are our moral responsibilities?

Upper Division

101. **History of Ancient Philosophy.** I. 3 hr. Major philosophies of the Western world from the pre-Socratics to Plotinus.

102. **History of Modern Philosophy.** II. 3 hr. PR: Phil. 101 or consent. Major philosophies of the Western world from Descartes to Kant.

103. **History of Medieval Philosophy.** I or II. 3 hr. Major philosophies of the Western world from Augustine to William of Occam.

106. **Mathematical Logic I.** I. 3 hr. PR: Phil. 2 or Math. 15 or consent. The logic of statements, relations and identity; introduction to the notions of consistency, completeness and decidability. (Equiv. to Math. 161.)

108. **Ethical Theory.** I or II. 3 hr. Topics in metaethics. Problems connected with the justification and meaning of ethical statements.

114. **Recent Philosophy I.** I. 3 hr. PR: Phil. 102 or consent. Major speculative philosophies of the Western world from Hegel to Whitehead.

115. **Recent Philosophy II.** I or II. 3 hr. PR: Phil. 3 or consent. A survey of the major twentieth century analytical philosophers.

121. **Existentialism.** I or II. 3 hr. Survey of the major existentialist thinkers.

122. **Philosophies of Asia.** I or II. 3 hr. The philosophies developed in Islamic countries, in India, and in China.

123. **Philosophy of Religion.** I or II. 3 hr. Major philosophical problems associated with religion.

130. **Aesthetics.** I or II. 3 hr. Philosophical problems associated with the nature of beauty, the nature of arts, and the justification of aesthetic evaluation.

150. **Social and Political Philosophy.** I or II. 3 hr. Application of moral concepts to questions concerning the individual and the state.

158. **Philosophy of Science.** I or II. 3 hr. Philosophical problems associated with the concepts and methodology of science.

166. **Metaphysics.** I or II. 3 hr. PR: Phil. 1, 3, or consent. Traditional problems associated with reality and experience, universals and particulars, causality, space and time, matter and mind, the nature of the self.

171. **Theory of Knowledge I.** I or II. 3 hr. PR: Phil. 1. The definition of knowledge. Close examination of skepticism of induction, perception, memory, and introspective knowledge.

172. **Theory of Knowledge II.** I or II. 3 hr. PR: Phil. 1. Consideration of the question "What is truth?" Investigation of the nature and basis of *a priori* knowledge.

183. **Philosophy of History.** I or II. 3 hr. Theoretical problems such as the nature of historical explanation, relativism, and the status of speculative principles of history.

185. **Philosophy of Language.** I or II. 3 hr. PR: Phil. 1. Philosophical problems concerning the nature of meaning and language.

187. **Philosophy of Mind.** I or II. 3 hr. PR: Phil. 3. The nature of mind and its relation to the body. Other minds. Analysis of mental concepts.

206. **Mathematical Logic II.** II. 3 hr. PR: Phil. 106 or Math. 161 or consent. A more formal and rigorous approach to the material covered in Phil. 106; selected problems in the philosophy of mathematics and the philosophy of logic. (Equiv. to Math. 261.)

223. **Philosophy of Religion.** I or II. 3 hr. PR: Phil. 123 or consent. Advanced topics in the philosophy of religion.

250. **Social and Political Philosophy.** I or II. 3 hr. PR: Phil. 150 or consent. Advanced topics in social and political philosophy.

253. **Philosophy of Mathematics.** I or II. 3 hr. PR: Phil. 106 or consent. Contemporary viewpoints in the foundations of mathematics.

264. **Empiricism.** I or II. 3 hr. PR: Phil. 102. Locke, Berkeley, and Hume.

268. **Rationalism.** I or II. 3 hr. PR: Phil. 102. Descartes, Spinoza, and Leibniz.

289. **Advanced Topics in Logic.** I or II. 3 hr. PR: Phil. 206 or consent.

PHYSICAL SCIENCES

Laboratory Fees

A nonrefundable fee is required of students taking the following laboratory courses:

Course	*Per Semester*
Physical Science 1	$10.00
Physical Science 2	10.00

Courses of Instruction in the Physical Sciences

Phys. Sci.

Lower Division

1, 2. **Introductory General Course.** I, II. 4 hr. per sem. Phys. Sci. 1 is not prerequisite to Phys. Sci. 2; in certain curricula either semester may be taken without the other, although the sequence Phys. Sci. 1, 2 best meets the objectives of the course.

The course has two main objectives: to serve as orientation for students who have not chosen their major field, and to present to those students who are not majoring in science a meaningful view of the methods, philosophy, accomplishments and limitations of science. Computation, essential to understanding certain modes of scientific thought, is not disdained; but any mathematical background beyond the minimum required for college admission is presented in the course itself.

A limited number of problems and propositions in astronomy, chemistry, geology, and physics are examined in some detail. It is considered more important to illustrate in actual practice the interrelations of the sciences (and the relationship of science to the whole of human experience) than to cover exhaustively the entire body of scientific information.

Students who have successfully completed as much as 8 hr. of chemistry or physics or geology cannot take Phys. Sci. 1 and 2 for credit. Three periods of lecture, one (optional) period of discussion, and one 2-hr. laboratory-demonstration period each week.

PHYSICS (including Astronomy and Meteorology)

Faculty

Arthur S. Pavlovic, Ph.D. (Penn. St. U.), *Chairman and Professor.*
Atam P. Arya, Ph.D. (Penn. St. U.), *Associate Professor.*
Stanley Farr, M.S. (WVU), *Assistant Professor.*
Martin V. Ferer, Ph.D. (U. Ill.), *Assistant Professor.*
Fred M. Goldberg, Ph.D. (U. Mich.), *Assistant Professor.*
William E. Greig, Ph.D. (U. Ill.), *Assistant Professor.*
Oleg Jefimenko, Ph.D. (U. Ore.), *Professor.*
Arnold D. Levine, Ph.D. (Columbia U.), *Professor.*
Albert E. Rainis, Ph.D. (U. Notre Dame), *Assistant Professor.*
Carl A. Rotter, Ph.D. (Case Tech.), *Associate Professor.*
Mohindar S. Seehra, Ph.D. (U. Rochester), *Associate Professor.*
Charles D. Thomas, Ph.D. (U. Chicago), *Professor.*
Charles D. Thomas, Jr., M.S. (WVU), *Instructor.*
Richard P. Treat, Ph.D. (U. Calif.), *Assistant Professor.*
William E. Vehse, Ph.D. (Carnegie-Mellon U.), *Professor.*
Douglas B. Williamson, Ed.D. (Columbia U.), *Associate Professor.*

Programs

The various programs and courses offered in physics are designed to lay a foundation for professional training of physicists, and to meet the needs of students majoring in areas where a background in physics is desirable. The

department also offers courses of interest and value to a broad range of students in areas of general physics, education, physical science, photography, astronomy, and meteorology.

Lower-division students who plan to become majors in the Department and who also wish to meet the requirements for teacher certification should so inform their lower-division adviser, and carefully plan their schedules in order to avoid loss of time.

SUGGESTED CURRICULUM FOR B.S. DEGREE IN PHYSICS

The Bachelor of Science degree is intended for students who want to qualify for professional positions in industry and government as well as for those who plan to do graduate work in physics; 136 hours are required.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Phys. Ed. 1	1	Phys. Ed. 2	1	Math. 17	4	Math. 18	4
English 1	3	English 2	3	Foreign Lang. 3	3	Foreign Lang. 4	3
Math. 15	4	Math. 16	4	Physics 12	4	Physics 124	4
Foreign Lang. 1*	3	Foreign Lang. 2	3	Chem. 15	4	Chem. 16	4
Physics 5	3	Physics 11	4	Core A or B	3	Core A or B	3
Core A or B	3	Core A or B	3				
	17		18		18		18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Physics 231	3	Physics 234	3	Physics 251	3	Phys. 200 level	3
Physics 233	3	Physics 283	3	Physics Lab.	2	Physics Lab.	1
Math.	3	Math.	3	Core A or B	3	Elective	3
Physics 213	3	Core A or B	3	Elective	3	Elective	3
Core A or B	3	Core A or B	3	Elective	3	Elective	3
Elective	3	Elective	3	Elective	3	Elective	3
	18		18		17		16

*French, German, or Russian are recommended.

Required courses: Physics 5, 11, 12, 124, 231, 233, 234, 241 (3 hr.), 251, 283, Electives (3 hr.); Math. 15, 16, 17, 18 or 51, 113; Electives (3 hr.); Chem. 15, 16 or 17, 18.

Substitutions and other changes in the program must be approved by the Department.

SUGGESTED CURRICULUM FOR A.B. DEGREE IN PHYSICS

The Bachelor of Arts degree is intended for students who want a foundation in physics but with a wider choice of elective subjects than is possible for those who enter the field at a professional level. The A.B. degree is well-suited for those desiring to teach at the secondary level; 128 hr. are required.

The first two years of study is the same for the A.B. degree and the B.S. degree except that Math. 18 may be replaced by a suitable mathematics elective.

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Physics 231	3	Physics 234	3	Physics Lab.	2	Elective	3
Physics 233	3	Physics 283	3	Core A or B	3	Elective	3
Core A or B	3	Core A or B	3	Elective	3	Elective	3
Elective	3	Core A or B	3	Elective	3	Elective	3
Elective	3	Elective	3	Elective	3	Elective	3
	15		15		14		15

Required courses: Physics 5, 11, 12, 124, 231, 233, 234, 241 (2 hr.), 283; Math. 15, 16, 17, Electives (3 hr.); Other science, 8 hr.

Laboratory Fees

A nonrefundable fee is required of all students who take the following laboratory courses in the Department of Physics:

Course	*Per Semester*	*Course*	*Per Semester*
Physics 1	$10.00	Physics 12	$10.00
Physics 2	10.00	Physics 116	10.00
Physics 11	10.00	Physics 357	10.00

Courses of Instruction in Physics

Professors Pavlovic (*Chairman*), Jefimenko, Levine, Thomas, and Vehse; Associate Professors Arya, Rotter, Seehra, and Williamson; Assistant Professors Farr, Ferer, Goldberg, Greig, Rainis, and Treat; Instructor Thomas.

Lower Division

1. **Introductory Physics.** I, II. 4 hr. Plane geometry and algebra. Mechanics, sound, heat, and thermodynamics. ($10.00 lab fee.)

2. **Introductory Physics.** I, II. 4 hr. PR: Physics 1. Electricity, magnetism, optics and light. ($10.00 lab fee.)

5. **Conceptual Development in Physics.** I. 3 hr. Primarily designed for physics majors. Introduction to the historical developments of concepts in physics.

9, 10. **Physics Problems.** I, II. 2 hr. PR: Physics 1, 2; Math. 15, 16. A problem solving course primarily designed for physics majors.

11. **General Physics.** I, II. 4 hr. PR: Math. 15. Not open to students who have credit for Physics 1. Mechanics, sound, heat, and thermodynamics. ($10.00 lab fee.)

12. **General Physics.** I, II. 4 hr. PR: Physics 11, Math. 16. Not open to students who have credit for Physics 2. Light, optics, electricity, and magnetism. ($10.00 lab fee.)

106. **Elementary Astronomy.** I, II. 3 hr. A discussion of the celestial sphere, star time, solar time, Kepler's laws, H-R diagram and modern developments. Trigonometry and calculus are not permitted. Simple geometrical arguments are used.

113, 114. **Introductory Electronics.** I, II. 3 hr. per. sem. PR: 1 year college physics. Principles of electronics, theory and practice, with applications and laboratory.

116. **Photography.** I, II. 3 hr. PR: 1 year college physics, 1 year college chemistry. The physics and chemistry of photography with practical application. ($10.00 lab fee.)

117. **Descriptive Meteorology.** I. 3 hr. PR: 1 year college physics or physical science. Descriptions of the atmosphere and its weather. Reading and analysis of weather maps. Weather observations. Special topics of current or particular interest.

118. **Physical Meterology.** II. 3 hr. PR: Physics 117 or equiv. The physics of the atmosphere. Analysis of surface and upper air charts. Forecasting.

124. **Modern Physics for Engineers.** I, II. 4 hr. PR: Physics 12. Topics of modern physics of interest to engineers: Relativity, atomic structure and spectra, solid state and nuclear physics.

125, 126. **Modern Physics.** I, II. 3 hr. PR: Physics 12. Aspects of modern physics of interest to physicists and engineers. Relativity, atomic structure and spectra, solid state and nuclear physics.

201, 202. **Special Topics.** I, II. 1-3 hr. per sem. PR: Consent. Directed or independent study of topics of current interest in physics.

213. **Electronics.** I, II. 3 hr. PR: Physics 12. Theory, experiments and applications of electronics; with laboratory.

216. **Astronomy for Teachers.** S. 3 hr. Not open to students with credit for Physics 106. Introduction to astronomy with special emphasis on the needs of physical science teachers and science club directors.

225. **Atomic Physics.** I, II. 3 hr. per sem. PR: Physics 251 or equiv. Relativistic mechanics, atomic structure and spectra.

231, 232. **Theoretical Mechanics.** I, II. 3 hr. per sem. PR: Calculus, Physics 12 or equiv. Scalar and vector fields, curvilinear coordinate systems, kinematics of particle motion. Systems of particles, rigid body motion, conservation motion, central force fields, constraints. Lagrangian and Hamiltonian methods, oscillations, coupled oscillators.

233, 234. **Electricity, Magnetism and Radiation Optics.** I, II. 3 hr. per sem. PR: Physics 12 or equiv. Electrostatics, magnetostatics, introduction to electrodynamics and applications.

241, 242. **Mechanics Laboratory.** I, II. 1 hr. per sem. Experiments in mechanics; vibrations, damped oscillations, viscosity, thermal expansion. Determination of mechanical constants, g, γ, Young's and shear moduli.

245, 246. **Modern Physics Laboratory.** I, II. 1 hr. per sem. Experiments in atomic, nuclear, and solid state physics. Emphasis on learning some of the techniques of experimental physics, methods of data evaluation, and error analysis.

247, 248. **Physics Seminar.** I, II. No credit. Suggested for junior, senior and graduate physics majors. This program of lectures acquaints students with topics of current interest in physics.

249. **Optics Laboratory.** I. 1 hr. PR: Physics 12 or equiv. Experiments in interference, diffraction, polarization, optical pumping, geometrical optics, and holography. Experience in using simple optical instruments.

251. **Introductory Quantum Mechanics.** I. 3 hr. PR: Physics 124 or 125 or 231, or 231, 232. Physical observables as operators. Operator equations, particularly the Schrodinger equation. Applications to one-dimensional motion, the harmonic oscillator, atomic structure and spin. Equation of motion.

252. **Introductory Quantum Mechanics.** II. 3 hr. PR: Physics 251. Approximate methods of calculation. Theory of scattering, radiation. Applications to atomic, molecular, nuclear, and solid state physics.

255. **Mathematical Astronomy.** I, II. 3 hr. PR: Physics 106, Math. 16. Development of the implications of Kepler's Laws and Newton's Law of Gravitation.

263. **Nuclear Physics.** I, II. 3 hr. PR: Physics 124 or equiv. The study of the characteristic properties of nuclei and their structure as inferred from nuclear decays and reactions, leading to a knowledge of nuclear forces and models.

271, 272. **Solid State Physics.** I, II. 3 hr. PR: Physics 124 or equiv. An introductory study of the properties of crystalline solids: includes crystal structure, binding, lattice vibrations and an investigation of thermal, electrical, magnetic, and optical phenomena based on the energy band theory.

283. **Thermodynamics.** I. 3 hr. PR: Physics 12 or equiv. The application of the fundamental laws of thermodynamics to physical and chemical systems.

284. **Kinetic Theory.** II. 3 hr. PR: Physics 12 or equiv. Introduction to the concepts of probability which lead to the derivation of the Boltzman, Fermi-Dirac, and Bose-Einstein statistics. The application of these statistics to physical and chemical systems.

287, 288. **Introduction to Mathematical Physics.** I, II. 3 hr. per sem. PR: Calculus, Physics 11, 12, or equiv. Introductory treatment of orthogonal functions, Laplace transform, Green's function, coordinate transformations, elasticity, and hydrodynamics.

301. **Special Topics.** I, II. 1-3 hr. per sem. PR: Consent. Primarily for graduate students. Specialized topics of current interest in physics.

313. **Introductory Electronics.** S. 3 hr. PR: 1 year college physics. Primarily for education majors, not for graduate credit for science majors.

318. **Air Pollution Meteorology.** II. 3 hr. PR: 1 year college physics, calculus. Primarily for students in engineering (air pollution). Summary of descriptive and dynamic meteorology relevant to air pollution. Disposal of pollutants from a point source. Special topics of current or particular interest.

321. **Optics.** II. 3 hr. PR: Calculus, Physics 11, 12 or equiv. A basic course in physical optics covering radiation theory, diffraction, interference, polychromatic waves, scattering, polarization, double refraction, and selected topics in quantum optics.

331, 332. **Advanced Classical Mechanics.** I, II. 3 hr. PR: Physics 233, 234, and differential equations. (Taught in alternate years.) Lagrange and Hamilton form of equations of motion, rigid bodies, small and non-linear oscillations. Transformation theory, relativistic dynamics, and systems with an infinite number of degrees of freedom.

333, 334. **Advanced Electricity and Magnetism.** I, II. 3 hr. PR: Physics 233, 234, and differential equations. (Taught in alternate years.) Electrostatic and magnetostatic boundary value problems. Maxwell's equations for time varying fields. Green's functions and integral representations; applications to radiation, diffraction, wave guides, plasma physics, and relativistic motion of charged particles.

341, 342. **Research Seminar.** I, II. 3 hr. PR: Consent. Discussion of problems encountered in particular fields of research and their relation to other areas of physics.

351, 352. **Quantum Mechanics.** I, II. 3 hr. per sem. PR: Physics 251. This course covers a wide range of topics of current interest at a level such that a student should be able to read basic research papers in many fields upon completion. Topics covered are: approximation methods, representation theory, angular momentum relativistic quantum mechanics, time dependent perturbation theory, identical particles, scattering, molecules, solids, magnetism, and second quantization of bosons and fermions.

354. **Outline of Modern Physics.** S. 3 hr. PR: 10 hr. college physics, 1 year college math. Primarily for education majors; not open to physics majors. Techniques of apparatus construction and demonstration.

355, 356. **Workshop for Physics Teachers.** SI, SII. 3 hr. per sem. PR: 1 year college physics, 1 year college math. Primarily for education majors; not open to physics majors. Techniques of apparatus construction and demonstration.

357. **Photography.** SI. 3 hr. PR: 1 year college physics or equiv. Primarily for education majors; not open to physics majors. The physics and chemistry of photography with practical experience. ($10.00 lab fee.)

358. **Light.** SII. 3 hr. PR: 1 year college physics or equiv. Primarily for education majors; not open to physics majors.

361, 362. **Molecular Physics.** I, II. 3 hr. per sem. PR: Physics 225. A presentation of the theory of molecular structure and spectra.

Courses of Instruction in Astronomy

Astron.

Upper Division

106. **Descriptive Astronomy.** II. 3 hr.

216. **Astronomy for Teachers.** S. 3 hr. Not open to students with credit for Astron. 106. Introduction to astronomy with special emphasis on the needs of physical science teachers and science club directors.

255. **Mathematical Astronomy.** II. 3 hr. PR: Astron. 106, Math. 16. Development of the implications of Kepler's Laws and Newton's Law of Gravitation.

POLITICAL SCIENCE

Faculty

David G. Temple, Ph.D. (U. Va.), *Acting Chairman and Professor.*
Orrin B. Conaway, Jr., Ph.D. (Syracuse U.), *Benedum Professor.*
Robert A. DeLapp, Ph.D. (MIT), *Assistant Professor.*
Robert E. DiClerico, M.A. (Ind. U.), *Instructor.*
Carl M. Frasure, Ph.D. (Ohio St. U.), *Professor Emeritus.*
Ralph F. Garn, M.A. (Brigham Young U.), *Assistant Professor.*
Royal C. Gilkey, Ph.D. (U. Minn.), *Professor.*
Allan S. Hammock, Ph.D. (U. Va.), *Assistant Professor.*
John A. Jacobsohn, Ph.D. (U. Md.), *Assistant Professor.*
Hong N. Kim, Ph.D. (Georgetown U.), *Associate Professor.*
H. Peter Marshall, M.S. (Mich. St. U.), *Assistant Professor.*
Herman Mertins, Jr., Ph.D. (Syracuse U.), *Professor.*
Sophia L. Peterson, Ph.D. (UCLA), *Associate Professor.*
George W. Rice, Ph.D. (Ohio St. U.), *Associate Professor.*
William R. Ross, M.A. (WVU), *Associate Professor.*
Harold J. Shamberger, M.P.A. (Wayne St. U.), *Assistant Professor.*
Irvin Stewart, Ph.D. (Columbia U.), *President Emeritus of West Virginia University and Professor Emeritus.*
James B. Whisker, Ph.D. (U. Md.), *Associate Professor.*
David G. Williams, Ph.D. (SUNY, Albany), *Associate Professor.*
John R. Williams, Ph.D. (Duke U.), *Professor.*
Rodger D. Yeager, Ph.D. (Syracuse U.), *Associate Professor.*

Program

The political science curriculum provides a systematized course of study of the origin, basis, and nature of the state in its many and varied aspects. These include: principles, organization, and structure of political institutions, both domestic and foreign; the processes and functioning of government; interrelationships between political institutions on various levels of government; political behavior; the control of government instrumentalities and the means for holding its agents responsible; and the identification and analysis of public problems falling within the range of government. Course offerings in the Department of Political Science provide a basic general knowledge of the field, as well as more extensive and intensive training in the specialized areas of political science, particularly in the senior and graduate levels.

Primary departmental objectives may be classified under four principal headings:

1. To develop an understanding of the role of government in modern society, thus contributing to a general, liberal education and to preparing students for a career in the public service.

2. To impart a basic knowledge and understanding of the techniques and processes of government and administration to those persons who look forward to a career in the public service.

3. To provide pre-professional training for students who are preparing to enter the legal profession.

4. To provide advanced and specialized instruction, through the Ph.D. degree, for persons who wish to enter teaching or research in political science.

The political science curriculum, therefore, enables the major in this field to gain an understanding of the political society in which he lives and also to plan his academic program so as to prepare himself for a career of public service.

Requirements for Majors

Hours. Undergraduate majors in political science are required to take at least 27 hours of upper-division course work in the Department. There must be a minor consisting of 12 hours of upper-division courses, normally in history, economics, sociology, psychology, English, geography, commerce, or statistics and computer science. A total of 45 upper-division hours is a requirement.

Required Courses. Each undergraduate major is required to take Pol. Sci. 1 (3 hr.) or 2 (3 hr.). Departmental majors are encouraged to take both Pol. Sci. 1 and 2. Departmental majors must take Econ. 51 and 52 and at least one course from two of the three following areas: psychology, sociology, geography. Six semester hours of history are also required.

Distribution of Courses. The major in political science should work out his program is such a way as to secure a well-rounded knowledge of the field, as well as to concentrate in some particular area. Although the 27 hours of upper-division work in political science is the minimum requirement, students should take at least 33 hours.

The following are distribution requirements for an undergraduate major in political science:

1. At least one upper-division course in political science in each of the six groups into which the offerings of the Department are divided.

2. At least three upper-division courses in political science in some one group.

Groupings of Upper-Division Courses by Fields

I. American National, State, and Local Government
Pol. Sci. 111, 113, 120, 121, 211, 213, 214, 215, 216, 225, 226, 310.

II. Politics and Policy Development
Pol. Sci. 130, 231, 232, 233, 234.

III. Public Administration
Pol. Sci. 140, 218, 244, 246, 341, 343, 345.

IV. Foreign and Comparative Government
Pol. Sci. 150, 251, 252, 253, 254, 255, 256, 257, 258, 259, 290, 295, 350, 391, 394.

V. International Relations, Organizations, and Law
Pol. Sci. 160, 261, 263, 264, 265, 266, 267, 268, 269.

VI. Political Theory
Pol. Sci. 270, 271, 272, 275, 373, 374.

COURSES SUGGESTED FOR POLITICAL SCIENCE MAJORS

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3
Core A or C	3-4	Core A or C	3-4
Foreign Lang.	3	Foreign Lang.	3
Phys. Ed. 1	1	Phys. Ed. 2	1
Pol. Sci. 1	3	Pol. Sci. 2	3
Psych. 1, Geogr. 7 or 8, or Sociol.	3	Psych. 1, Geogr. 7 or 8, or Sociol. 1	3
	16-17		16-17

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Core A or C	3-4	Core A or C	3-4
Foreign Lang. (if needed) or History	3	Foreign Lang. (if needed) or History	3
Econ. 51	3	Econ. 52	3
Pol. Sci. (100 level)	3	Pol. Sci. (100 level)	3
Electives	3-6	Electives	3-6
	15-19		15-19

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Core (if needed)	3-4	Core (if needed)	3-4
Pol. Sci. 200	3	Pol. Sci.	3-6
Pol. Sci.	3-6	Minor	3-6
Minor	3-6	Electives	3-6
	15-19		15-19

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Pol. Sci. 270	3	Pol. Sci. 271	3
Pol. Sci.	3-6	Pol. Sci.	3-6
Minor	3-6	Minor	3-6
Electives	3-6	Electives	3-6
	15-18		15-18

Courses of Instruction in Political Science

Professors Temple (*Acting Chairman*), Conaway, Gilkey, Mertins, and J. R. Williams; Associate Professors Kim, Peterson, Rice, Ross, Whisker, D. G. Williams, and Yeager; Assistant Professors DeLapp, Garn, Hammock, Jacobsohn, Marshall, and Shamberger; Instructor DiClerico.

Pol. Sci.

Lower Division

1. **Elements of Democratic Government.** I, II. 3 hr. Primarily for freshmen. Introduction to government. Origin, forms, and functions of the state; organization and forms of government; and the relations of groups and individuals to the state.

2. **The American Federal System.** I, II. 3 hr. Intended primarily for freshmen and sophomores. A survey course in American national government.

Upper Division

101. **Introduction to Government.** I, II. 3 hr. Exclusively for students in the College of Agriculture and Forestry and the College of Engineering. A consideration of the basic principles and operation of national, state, and local government in the United States.

111. **Functions of American National Government.** I, II. 3 hr. The activities of the executive branch of government, particularly as they relate to social and economic development; expansion of government activities and services since 1932.

113. **American Constitutional Principles.** I. 3 hr. U. S. Constitution as interpreted by the Supreme Court. Treatment is analytical rather than historical. Text supplemented by some leading cases.

120. **State and Local Government.** I, II. 3 hr. Survey of the legal basis, structure, politics and operation of state and local governments, their relations with each other and their place in the federal system.

121. **Introduction to Urban Planning.** I, II. 3 hr. Structure of urban communities; history, processes, and objectives of planning; trends in planning and urban development.

130. **Political Parties and Electoral Processes.** I, II. 3 hr. The nature of political parties. Public regulation of parties and electoral processes. A close examination of suffrage, nominating devices, campaign procedures, and the conduct of elections.

140. **Introduction to Public Administration.** I, II. 3 hr. Introductory study of the development, organization, procedures, processes, and human relation factors of governmental administration in American democracy.

150. **Contemporary European Governments.** I, II. 3 hr. Comparative analysis by countries of constitutions, political structures, and functions, with major emphasis upon the United Kingdom, France, Russia, and West Germany.

160. **International Relations.** I, II. 3 hr. Introduction to contemporary world politics. Just enough background to make present-day international affairs more understandable.

188. **Honors Seminar.** I, II. 3 hr. PR: At least 12 hr. upper-division work in political science, recommendation of adviser, consent. For superior junior and senior students who are political science majors; may be taken more than once.

189. **Selected Topics (Honors).** I, II. 3 hr. PR: Pol. Sci. 188, or at least 15 hr. upper-division work in political science, recommendation of adviser, consent. Designed for superior junior and senior students majoring in political science; will permit independent research and reading. May be taken more than once.

200. **Research Materials and Techniques in Political Science.** I. 3 hr. A study of basic source materials in political science and of the techniques and methods of governmental research.

211. **Problems of American National Government.** II. 3 hr. Course intended to give recognition to the major contemporary problems of government. Extensive reading of background materials as well as current literature in the field.

213. **American Constitutional Law.** I. 3 hr. PR: Pol. Sci. 2 or consent. Primarily for seniors and graduate students. Basic principles of American constitutional law as developed through interpretation with special emphasis on constitutional theories and national development.

214. **Civil Rights and Liberties in the United States.** II. 3 hr. PR: Pol. Sci. 213 or consent. Study of the scope and meaning of civil liberty guarantees in the United States Constitution, as illustrated by cases involving original constitutional provisions, the federal Bill of Rights and Civil War amendments with special attention to the rule of law; free speech, press, religion, assembly, and petition; personal security; racial discrimination; and the labor problem.

215. **American Constitutional Development I.** I. 3 hr. PR: Pol. Sci. 2 or consent. Survey of American constitutional development, with special emphasis on the origins of constitutionalism here; liberty vs. government; mixed government; separation of powers; the problem of federalism and the Philadelphia Convention of 1781; the Marshall court and establishment of judicial review; Federalist vs. States Rights construction of the Constitution; Jacksonian influences; the Taney Court prelude to the Civil War, secession, and conflict, heralding constitutional change.

216. **American Constitutional Development II.** II. 3 hr. PR: Pol. Sci. 2, 215, or consent. Continuation of a survey in American constitutional development, with special attention to reconstruction, the Supreme Court, and the Fourteenth Amendment; *laissez-faire* and the commerce clause; stirrings of reform toward a constitutional revolution under the New Deal; changing federal-state relationships; the impact of war upon constitutional interpretation; an expanding role for the president in domestic matters and foreign relations; the Warren Court and triumph for libertarian activists over judicial restraintists in an era of civil liberties.

218. **Government and Business.** II. 3 hr. PR: Pol. Sci. 2 or consent. Examination of government regulations of the economy dealing with the origin and development of public policies, constitutional and political basis of regulation, relationships between political and economic institutions and processes, and an evaluation of the consequences of regulatory policies.

221. **West Virginia Government and Administration.** I, II. 3 hr. Study of the organization and operation of the state government of West Virginia.

225. **Municipal Government.** I. 3 hr. Legal basis, structure, processes and politics of urban governments and cooperative-conflict relations with other governmental units.

226. **Problems of State and Local Government.** II. 3 hr. Students are expected to have completed Pol. Sci. 120 or equiv. Examination of current problems of state, county, and municipal governments.

231. **History of Political Parties.** I. 3 hr. Examination of the growth of political parties in the United States. Analysis of issues in presidential campaigns as they relate to political party development. Offered in odd-numbered years.

232. **Public Opinion and Propaganda.** II. 3 hr. Analysis of techniques of sampling and measuring public opinion; detection of propaganda; the nature of propaganda and methods of the propagandist. Offered in alternate years.

233. **Current Political Issues.** I. 3 hr. Examination of political party platforms and the major issues of the political campaign. Students will be expected to examine background materials thoroughly. Offered in even-numbered years.

234. **The Legislative Process.** II. 3 hr. Structure and organization of legislative bodies. Powers of legislature. Detailed study of law-making procedures. The influence of outside forces. Offered in alternate years.

244. **Administrative Law and Regulation.** II. 3 hr. PR: Pol. Sci. 140 or consent. Study of the law of administration, primarily by the case method, covering administrative powers, procedure in administrative adjudication and rule-making, discretion, judicial control, and administrative liability.

246. **Comparative Public Administration.** II. 3 hr. The theory and practice of public administration in diverse cultures and national political systems.

251. **Modern Dictatorships.** II. 3 hr. Politically undemocratic governments. Provides background of dictatorship generally, followed by treatment of several modern dictatorships.

252. **British Government and Politics.** II. 3 hr. Intensive study of British government with emphasis upon both internal and external policies, primarily during the twentieth century.

253. **Contemporary Governments of the Commonwealth.** II. 3 hr. Analysis of the political relationships between the members of the Commonwealth and a comparative study of the governments and politics of the dominions with particular reference to Canada and Australia.

254. **Governments of Asia.** I. 3 hr. Survey of political institutions and governmental processes of Japan, China, and India with a special emphasis on the analysis of contemporary political problems of the governments surveyed.

255. **Governments of Latin America.** I. 3 hr. Comparative study of the major nations of Latin America.

256. **Governments of the Middle East.** II. 3 hr. The governments and political forces of the Middle East.

257. **Governments of Southeast Asia.** II. 3 hr. Survey of political institutions and governmental processes of the Southeast Asian countries with a special emphasis on the analysis of contemporary political problems of the governments surveyed.

258. **Politics of Africa.** I. 3 hr. A survey of the historical legacies and current political processes of tropical African countries, designed primarily for secondary-level social studies teachers who are pursuing graduate training.

259. **Political Tour of Europe.** 6 hr. PR: Pol. Sci. 1, 2, or consent. Examination of governments and politics in selected European countries. Lectures and discussions supplement observation while visiting these countries.

261. **International Organization.** I. 3 hr. PR: Pol. Sci. 160 or consent. Emphasis upon agencies created since the close of World War II. Some reference to development of international law and League of Nations.

263. **Public International Law.** I. 3 hr. Law governing relations among nations, including development of rules, means of enforcement, and conflicts between theory and practice.

264. **Conduct of American Foreign Relations.** I. 3 hr. Basic concepts about and factors influencing the decision-making process and the conduct of United States foreign policy, with special attention to the problems of ends and means of a democracy, pressure interest groups (i.e. the military-industrial complex and the administrative bureaucracy); recent theories, analytical tools, and methodology in the problem areas of conflict-resolution, nonconsensus situations, and inter-nation influence; regional patterns, problems, and prospects of United States policy in Europe, Africa, Asia, and Middle East, and the Soviet bloc since 1945.

265. **Basic Factors in Power Politics.** II. 3 hr. PR: Pol. Sci. 2 or consent. Analysis of factors of power in the nation-state system. Evaluation of nationalism and concepts of national interest in modern world politics.

266. **Soviet Foreign Policy.** I. 3 hr. PR: Pol. Sci. 150 or 160 or consent. Basic concepts about and factors influencing choice in the formulation and execution of Soviet foreign policy; the development and present patterns in Soviet foreign relations with key states and the United Nations; possible problems and prospects in future Soviet relations.

267. **Latin America in International Affairs.** II. 3 hr. PR: Pol. Sci. 160 or 225 or consent. Survey of the relations of Latin American states among themselves, with the United States of America, with the United Nations, with regional organizations, and with non-Western states. Analysis in depth of the Monroe Doctrine and its corollaries, and the Inter-American system.

268. **Inter-State Conflict in International Affairs.** II. 3 hr. PR: Pol. Sci. 160 or consent. The study of conflict in inter-state relations, in particular armed conflict between nations. Attention to the role of force, the impact of modern technology and nuclear weaponry, theoretical and research approaches to the causes and nature of conflict, and different modes of conflict control and resolution.

269. **Far Eastern International Relations.** II. 3 hr. PR: Pol. Sci. 160 or 254 or 257 or consent. A survey of the international relations of the Far Eastern countries with emphasis on the historic roots of recent conflicts, the competitive role of the United States and the Soviet Union, confrontation between the Communist and anti-Communist countries in the region, and the regional cooperation and security problems in the post-war period.

270. **History of Political Thought: Plato to Machiavelli.** I. 3 hr. Examination of major political ideas from the Greeks to sixteenth century with special emphasis upon development of natural law and western conception of justice.

271. **History of Political Thought: Machiavelli to Bentham.** II. 3 hr. PR: Pol. Sci. 270 or consent. Analysis of the political ideas which developed from the separation of faith and reason, the culmination of this movement in rational integral liberalism, and the origins of modern conservatism as expounded by Edmund Burke.

272. **Recent and Contemporary Political Thought.** I. 3 hr. Examination of integral liberalism and the forces leading to the decline of liberalism and a critical analysis of the Fascist and Communist idealogies with their threat to the traditions of western civilization embodied in Christianity and conservatism.

275. **Foundations of Jurisprudence.** II. 3 hr. Multiphase inquiry into: (a) the nature, end, and sanctions of law; its sources, forms, and modes of growth, as evidenced in typical legal systems; general juristic conceptions of rights, duties, and liabilities as well as persons, acts, and things; (b) the main schools of jurisprudence—analytical, historical, philosophical, sociological, and that of legal realism; (c) the economic interpretation of law and its relation to property and interest; (d) the problem of legal rule versus discretion; (e) the meaning of obligation, with special reference to contract; (f) stages in the development of legal institutions, forms and procedures (as exemplified in

trials); (g) significant theories about law; and (h) the status of law in today's world.

290. **Socio-Politics of Africa.** I. 3 hr. Comparative inquiry into political behavior and its social bases in tropical Africa, with particular reference to eastern and central Africa.

295. **The Politics of Planned Development.** II. 3 hr. Comparative study of the political aspects of directed economics and technological change, with special reference to the politics of national development planning and the development process.

310. **American Political Institutions.** I. 3 hr. PR: Pol. Sci. 2 or consent. Development of the Constitution, Congress, and Presidency, and the Supreme Court as institutions with special attention to current problems and issues.

341. **Administrative Organization and Management.** I. 3 hr. PR: Pol. Sci. 140 or consent. Analysis of governmental administrative organization and reorganization and of such management functions as leadership, planning, coordination, public relations, and management improvement.

343. **Public Personnel Administration.** II. 3 hr. PR: Pol. Sci. 140 or consent. Survey of public personnel administration with particular attention to the merit system concept, career staffing, classification and salary administration, selection, manpower utilization, training, the rights and duties of employees, and the relationship between management and personnel specialists. Emphasis on psychological and human relations aspects of the work situation with attention to role and status, motivation, leadership, employee relations, and supervisor-subordinate interaction.

345. **Public Administration and Policy Development.** II. 3 hr. PR: Pol. Sci. 140 or consent. Analysis of decision-making and policy development in the administrative process by the case method.

350. **Comparative Government.** I. 3 hr. Comparative study of modern political institutions with particular attention to European constitutional government and politics.

373. **American Political Theory.** II. 3 hr. PR: Pol. Sci. 271 or consent. Survey of major political ideas and their influence upon American society and government from the seventeenth century to the present. Offered in alternate years.

374. **Problems in Contemporary Political Thought.** II. 3 hr. Intensive study of current trends in political thought through examination of the works of contemporary writers. Offered in alternate years.

391. **Leadership and Authority in Africa.** II. 3 hr. Comparative study of traditional, colonial, and contemporary political leadership and authority patterns in Africa south of the Sahara.

394. **The Theory of Political Development.** I. 3 hr. Survey of contemporary theories concerning political change and the relationship of political change to economic and technological development with particular reference to the new nations.

PSYCHOLOGY

Faculty

K. Warner Schaie, Ph.D. (U. Wash.), *Professor; Chairman.*
T. John Akamatsu, Ph.D. (U. Mo.), *Assistant Professor.*
Edward C. Caldwell, Ph.D. (U. Syracuse), *Associate Professor.*
James F. Carruth, Ph.D. (U. Ill.), *Professor.*
Norman Cavior, Ph.D. (U. Houston), *Assistant Professor.*
Stanley H. Cohen, Ph.D. (Mich. St. U.), *Assistant Professor.*
Philip E. Comer, Ph.D. (WVU), *Associate Professor.*
John D. Cone, Ph.D. (U. Wash.), *Associate Professor.*
Charles D. Corman, Ph.D. (Ohio St. U.), *Associate Professor.*
Quin F. Curtis, Ph.D. (U. Mich.), *Professor.*
Robert L. Decker, Ph.D. (Carnegie-Mellon U.), *Associate Professor.*
Merrill F. Elias, Ph.D. (Purdue U.), *Associate Professor.*
Irving J. Goodman, Ph.D. (U. Rochester), *Associate Professor.*
D. Dwight Harshbarger, Ph.D. (U. N. Dak.), *Associate Professor.*
Alfred Jacobs, Ph.D. (U. Iowa), *Professor.*
Marion Jacobs, Ph.D. (U. Sou. Calif.), *Adjunct Assistant Professor.*
Vernon Scott Johnson, Ph.D. (Iowa St. U.), *Adjunct Assistant Professor.*
Penelope L. Kelly, Ph.D. (U. Rochester), *Assistant Professor.*
Kennon A. Lattal, Ph.D. (U. Ala.), *Assistant Professor.*
Roger F. Maley, Ph.D. (U. Nebr.), *Associate Professor; Associate Chairman.*
Robert W. Miller, Ph.D. (Ohio St. U.), *Professor.*
Yvonne D. Oslin, Ph.D. (Ga. St. U.), *Adjunct Assistant Professor.*
Joseph Panepinto, Ph.D. (WVU), *Adjunct Assistant Professor.*
B. Kent Parker, Ph.D. (U. Utah), *Assistant Professor.*
Eugene Quarrick, Ph.D. (Syracuse U.), *Associate Professor.*
Hayne W. Reese, Ph.D. (U. Iowa), *Centennial Professor.*
Mary Lou Schack, Ph.D. (Temple U.), *Assistant Professor.*
James N. Shafer, Ph.D. (Ohio St. U.), *Professor.*
E. Wayne Sloop, Ph.D. (Fla. St. U.), *Adjunct Assistant Professor.*
R. T. Walls, Ph.D. (Penn. St. U.), *Adjunct Associate Professor.*

Objectives

Courses in psychology are designed for one or more of the following ends: (1) As part of a liberal arts education principles, methods and theories are conveyed which are necessary for a better understanding of human and animal behavior; (2) basic preparation for students interested in graduate work leading to a career in basic or applied psychology; (3) preparation for a career as a bachelor's level psychological assistant or technician, or as background for work in related social science fields.

The emphasis of preprofessional undergraduate training in psychology is placed on broad education in the behavioral, biological, physical and social sciences, and the humanities. Excessive specialization in psychology is discouraged for students who intend to pursue training in psychology at the graduate level. Such students should rather seek a strong supporting background in mathematics and the natural and social sciences. They also should gain language competence in French, German, or Russian. A strong major, however, is recommended for students who do not intend to continue their education beyond the bachelor's degree.

Required Courses for Major

Lower Division:

Psych. 1. Introduction to Psychology
Psych. 2. Introduction to Experimental Psychology*
Stat. 101. Introduction to Statistical Methods

Upper Division: One course each from the following three groups:

(1) Experimental psychology:
Psych. 121. Intermediate Experimental Psychology
Psych. 122. Introduction to Conditioning and Learning
Psych. 123. Learning and Thinking

(2) Psychology of individual behavior:
Psych. 141. Introduction to Human Development
Psych. 161. Individual Differences
Psych. 164. Personal and Social Adjustment

(3) Psychology of group behavior:
Psych. 101. Leadership and Human Relations
Psych. 151. Introduction to Social Psychology

In addition five other three-hour upper-division courses are required.

*Transfer students may elect to substitute Psych. 122 for Psych. 2. In that case they must then take one additional course from the experimental psychology group.

Recommended Electives

Students planning to do graduate work should register during at least one semester in Psych. 213 (Directed Studies) to be involved in some research or directed reading project under individual supervision by a faculty member. Students interested in college teaching would benefit from similar registration to participate in one of the tutorial programs operated in conjunction with Psych. 1 or 141. Students must obtain instructor's consent before registering for Psych. 213 on a special form obtainable in the department office. Note that no more than six hours of Psych. 213 may be counted towards satisfying the major requirement.

Psych. 219 (a one-hour course) is specifically designed for students intending to pursue graduate work in psychology or who wish to work as psychological assistants at the B.A. level. Such students should take this course in the First Semester preceding their graduation.

Senior majors holding a 3.0 overall average or better are encouraged to register in selected 300 level courses. They should realize, however, that they will be judged by the same performance criteria as the graduate students for whom such courses are primarily offered. Students must obtain the consent of the individual instructor and of the Graduate School Dean before registering for such courses.

Psychology majors will find the following electives particularly useful:
Biol. 231, 251, 266; Math. 3, 15, 16, 28, 121, 125, 163, 241; Phil. 158; Pol. Sci. 120, 121, 140, 226; Sociol. 51, 71, 101, 121, 122, 132, 133, 135, 154, 201, 205, 231; Stat. 201, 231; Comp. Sci. 1, 101; CDFR 244, 245; S.W. 51, 200, 210.

SUGGESTED SCHEDULE OF REQUIRED AND RECOMMENDED COURSES

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Foreign Lang.	3	Foreign Lang.°	3
Foreign Lang.	3	Foreign Lang.	3	Stat. 101	3	Core A or C°°	0-6
Phys. Ed. 1	1	Phys. Ed. 2	1	Core A or C°°	3	Psych. 121,	
Psych. 1	3	Psych. 2	3	Core B°°	3	122, 123	3
Core A or C°°	6-9	Core A or C°°	6-9	Psych. 101		Psych. 141,	
				or 151	3	161, 164	3
				Electives°°°	3	Electives°°°	0-9
	16-19		16-19		18		15-18

°Students intending to do graduate work in psychology should do language work in French, German, or Russian, unless they are interested in cross-cultural research within the United States, in which case Spanish would also be appropriate. Students should continue work in the language in which they began at the high school level to permit attaining adequate language proficiency.

°°Biol. 1-2 should be taken in Core C by students intending to do graduate work in psychology. Such students and those in the liberal arts track should elect Sociol. 51 in Core B. Preprofessional students should take Sociol. 71.

°°°Students not intending to do work beyond the B.A. should take S.W. 51.

Third and Fourth Years

Programs here will depend upon the student's objectives. All programs suggested assume that lower-division requirements and the required three 100-level courses have been completed prior to the third year. Otherwise these requirements must be substituted for general electives. Certain courses will be referred to by group. These groups are as follows: Clinical psychology: 164, 262, 263, 271, 281, 282, 355, 381; Developmental psychology: 141, 161, 242, 243, 244, 245, 340; Experimental psychology: 121, 122, 223, 321, 322, 323, 324, 331, 347; Group psychology: 101, 151, 253, 351.

LIBERAL ARTS TRACK

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Dev. Psych.	3	Psych. 218	3	Clin. Psych.	3	Psych. elect.	3
Exp. Psych.	3	Electives	12-15	Electives	12-15	Electives	12-15
Electives	9-12						
	15-18		15-18		15-18		15-18

PREPARATION FOR GRADUATE WORK

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Dev. Psych.	3	Psych. 213	3	Clin. Psych.	3	Psych. elect.	3
Exp. Psych.	3	Psych. 218	3	Psych. 219	1	Biol. 266	3
Foreign Lang.°	3	Foreign Lang.°	3	Psych. 314 or		Electives	9-12
Comp. Sci. 1	3	Math.	3	Stat. 231	3		
Electives	3-6	Electives	3-6	Comp. Sci. 101	3		
				Electives	4-9		
	15-18		15-18		14-19		15-18

°Students should continue work in the same language begun in lower division. Language work is wasted unless as a minimum reading or conversational competence is attained.

PSYCHOLOGICAL ASSISTANT OR TECHNICIAN TRACK

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Dev. Psych.	3	Dev. Psych.	3	Psych. 213	3	Group Psych.	3
Clin. Psych.	3	Clin. Psych.	3	Psych. 219	1	Psych. 213	3
Sociol. 133,		Sociol. 122	3	Psych. 262	3	S.W. 210	3
135 or 123	3	Pol. Sci. 140	3	S.W. 200	3	Electives	6-9
Pol. Sci. 120		Electives	3-6	Electives	4-9		
or 121	3						
Electives	3-6						
	15-18		15-18		14-19		14-19

Courses of Instruction in Psychology

Professors Schaie (*Chairman*), Carruth, Curtis, Jacobs, Miller, Reese, and Shafer; Associate Professors Maley (*Associate Chairman*), Caldwell, Comer, Cone, Corman, Decker, Elias, Goodman, Harshbarger, and Quarrick; Adjunct Associate Professor Walls; Assistant Professors Akamatsu, Cavior, Cohen, Kelly, Lattal, Parker, and Schack; Adjunct Assistant Professors Jacobs, Johnson, Oslin, Panepinto, and Sloop.

Psych.

Lower Division

1. **Introduction to Psychology.** I, II, S. 3 hr. Survey of general psychology.

2. **Introduction to Experimental Psychology.** I, II, S. 3 hr. PR: Psych. 1. Lectures, demonstration, and laboratory exercises in sensory processes, perception, learning. ($5.00 lab fee.)

Upper Division

101. **Leadership and Human Relations.** I, II, S. 3 hr. PR: Psych. 1. Leadership training, motivation and morale, human relations, safety, industry, and society.

111. **Statistical Methods in Psychology.** I and II. 0 hr. PR: Psych. 1. (Not offered 1973-74.) Analysis and interpretation of psychological data. Open to psychology and sociology majors who are concurrently enrolled in Stat. 101.

121. **Intermediate Experimental Psychology.** I, II, S. 3 hr. PR: Psych. 2. Principles of experimental method, psychophysics, and sensory processes surveyed at intermediate level.

122. **Introduction to Conditioning and Learning.** I, II, S. 3 hr. PR: Psych. 2. Lectures and lab. Principles of learning surveyed at intermediate level. Lab exercises and demonstrations. ($10.00 lab fee.)

141. **Introduction to Human Development.** I, II, S. 3 hr. PR: Psych. 1. An introduction to concepts, theories, and methods of studying human development throughout the entire life cycle. Individual projects required.

151. **Introduction to Social Psychology.** I, II, S. 3 hr. PR: Psych. 1. Social factors which determine human behavior. The relationship of class, race, culture,

social structure, and other group phenomena to individual behavior. Other topics include: attitudes, public opinion, propaganda, mass media, and national character.

161. **Individual Differences.** I or II. 3 hr. PR: Psych. 1. Primarily for students of psychology and education. Nature and extent of differences among individuals in such traits as intelligence, achievement, personality, and interests as affected by hereditary and environmental differences and by such variables as schooling, socio-economic status, sex, age, and race.

164. **Personal and Social Adjustment.** I, II, S. 3 hr. PR: Psych. 1. Not open for credit to students who have completed Psych. 264. Applications of material from personality, abnormal, clinical, and social psychology to the problems of achieving positive personality change.

201. **Personnel Psychology.** I or II. 3 hr. PR: Psych. 1, Stat. 101, or equiv. Application of psychological principles and techniques to the problems of measurement and prediction of proficiency in industry and society. Topics include proficiency measurement, personnel selection by test and interviews, conditions of work and productivity, engineering psychology, work methods and safety.

202. **Job Analysis.** 3 hr. PR: Psych. 201 or consent. (Not offered 1973-74.) Of interest to students in psychology, guidance, engineering, management and rehabilitation counseling. Instruction and supervised practice in the preparation of job analysis and in the use of occupational descriptions.

213. **Directed Studies.** I, II, S. 1-3 hr. per sem. PR: Instructor's written consent. Individually supervised reading, research and/or classroom management projects. No more than 6 hr. may be applied to major requirements.

218. **History of Psychology.** I or II. 3 hr. PR: 9 hr. psychology or graduate standing. Traces the development of the science and concepts of psychology from their origin in philosophy, physiology, and medicine up to the modern era.

219. **Survey of Psychology.** I. 1 hr. PR: Senior standing. Of primary interest to psychology majors and/or graduate students in other fields who are considering graduate work in psychology. Overview of modern psychology with special reference to problems of graduate and professional training.

223. **Learning and Thinking.** I, II, S. 3 hr. PR: 9 hr. psychology or graduate standing. Not open to students who have credit for Psych. 123. An introduction to complex human behavior with emphasis upon the processes underlying learning and cognition. Special attention is accorded the mechanisms of memory, language, verbal behavior, and conceptual processes.

242. **Infant Behavior.** I or II. 3 hr. PR: 9 hr. psychology including Psych. 141 or CDFR 141, 142, or graduate standing. Systematic investigation of the basic areas of human development during the first years of life. Topics such as infant motor development, conditioning and learning, language development, sensory and motor processes will be examined.

243. **Child Behavior.** I or II. 3 hr. PR: 9 hr. of psychology including Psych. 141 or CDFR 141, 142, or graduate standing. An examination of the literature in experimental child psychology including growth trends in behavior in the physical, intellectual, emotional, social and personality areas.

244. **Adolescent Behavior.** I or II. 3 hr. PR: 9 hr. psychology including Psych. 141 or CDFR 141, 142, or graduate standing. Psychosexual, psychosocial, and other focal problems of development during adolescence are stressed. Cultural influences such as compulsory education, social movements, delinquency, sex roles, and drug abuse are discussed in the context of adolescent development.

245. **Adult Behavior.** I or II. 3 hr. PR: 9 hr. psychology including Psych. 141 or CDFR 141, 142, or graduate standing. Cognitive and personality changes from maturity to old age. Psychological reactions to physiological change and to the establishment and dissolution of family units. Problems of intergenerational differences in adult behavior.

253. **Attitudes and Social Change.** I. 3 hr. PR: Psych. 151 or consent. The nature of attitudes and opinions, attitude measurement, opinion changing, propaganda use and analysis, the social psychology of mass media, democratic values, and public opinion. Of interest to students in psychology, sociology, political science and journalism.

262. **Introduction to Clinical Assessments.** I, II. 3 hr. PR: Stat. 101 and consent. Theory underlying the construction and use of psychometric measurement techniques for evaluating aptitudes, interests, attitudes and personality.

263. **Introduction to Personality.** I, II, S. 3 hr. PR: 9 hr. psychology or graduate standing. The development and significance of the personality concept in psychology including a survey of the major theories such as psychoanalytic, interpersonal, trait, and learning.

264. **Psychology of Adjustment.** I, II, S. 3 hr. PR: 9 hr. psychology or graduate standing. Not open for credit to students who have completed Psych. 164. Dynamic principles of human personality adjustment. Primarily for non-majors.

271. **Introduction to Clinical Psychology.** I or II. 3 hr. PR: 9 hr. psychology or graduate standing. Of interest to advanced undergraduates and graduates in education, guidance, personnel, pre-medicine and social work as well as professionally-oriented students in psychology. Review of concepts, techniques, and professional roles in clinical psychology.

281. **Abnormal Psychology.** I and II. 3 hr. PR: 9 hr. psychology or graduate standing. Survey of the major behavioral disorders—neurosis, psychosis, and character disorders. Emphasis on the developmental dynamics leading to these disorders, and on their psychological treatment.

282. **Exceptional Children.** I or II. 3 hr. PR: 9 hr. psychology including Psych. 141, or CDFR 141 or 142, or graduate standing. Of special interest to those who regularly deal with children, such as teachers, guidance counselors and nurses. Study of children who present psychological problems because of: (1) exceptional mental retardation or advancement; (2) organic disabilities having behavioral consequences, such as cerebral palsy or deafness; (3) disorders of conduct associated with a typical personality functioning.

304. **Leadership and Human Relations in Working Groups.** I or II. 1-3 hr. PR: Consent. Individual work related to either research or practice in the field of human relations training programs.

307. **Practicum in Industrial Interviewing.** I or II. 3 hr. PR: Psych. 201 or consent. An intensive review of principles of selection and validation as they relate

to the interview. Practice interviews applying non-directive techniques in employment and other types of interview with critiques by the instructor.

311. **Research Design in Psychology.** I. 3 hr. PR: Elementary statistics and consent. For majors only. Issues and elements of empirical inquiry, quantification of concepts, manipulation, controls and confounds, examination of exemplary research designs in specific content areas of psychology.

312. **Data Analysis in Psychology.** II. 3 hr. PR: Psych. 311 or consent. For majors only. Inferential statistics, analysis of variance, simple correlation and regression, special topics in data analysis in psychology.

313. **Directed Study.** I, II, S. 1-3 hr. per sem. PR: Instructor's written consent. Directed reading and research in special areas. (Undergraduates should register for such projects under Psych. 213.)

314. **Theory of Tests and Measurement.** I. 3 hr. PR: Elementary statistics and consent. Theory underlying psychological scaling, mathematical models, classical psychometrics. Includes introduction to concepts of reliability, validity, correlation and regression, multivariate analysis procedures.

315. **Multivariate Analysis.** I or II. 3 hr. PR: Psych. 311, or 314, or equiv., and consent. Correlational methods in psychology with application to typical research problems. Includes simple matrix algebra, multiple correlation, discriminant analysis, and an introduction to factor analysis. (Equiv. to Stat. 341.)

321. **Sensory Processes.** I or II. 3 hr. PR: Psych. 121, or 122, or equiv. Psychophysics of vision and audition are analyzed and related to current theories. Methods of research on sensory processes are reviewed.

322. **Conditioning and Learning.** I or II. 3 hr. PR: Psych. 122 and consent. Review of current research in operant and classical conditioning. Controversial issues in learning are reviewed in light of recent research and theories.

323. **Perceptual and Cognitive Processes.** I or II. 3 hr. PR: Psych. 121, or 123, or equiv. Consideration of classical and contemporary research and theory on perception and cognitive processes, including concept formation and thinking.

324. **Motivation.** I or II. 3 hr. PR: Psych. 121, or 122, or equiv. Survey of experimental data and theory in the area of motivation as it relates to learning and personality.

331. **Physiological Psychology.** I or II. 3 hr. PR: Psych. 121, 122, Biol. 266 or equiv. The biological bases for psychological activities such as perception, emotion, motivation and learning.

340. **Advanced Developmental Psychology.** I or II. 3 hr. PR: Psych. 141, 314, or equiv. and consent. Research methods and substantive findings in the psychology of human development from birth to death, emphasizing developmental processes over the entire life-span.

347. **Comparative Psychology.** I or II. 3 hr. PR: Biol. 266, Psych. 121 or 122. Comparison of the structure of representative animals of the various phyla in relation to differences in behavior.

351. **Advanced Social Psychology.** I or II. 3 hr. PR: Psych. 151 and consent. Consideration of contemporary theory and practice in social psychology.

355. **Behavioral Science and Health Care.** II. 3 hr. PR: Consent. Principles of behavioral science applied to issues in physical and mental health care. Topics include the study of interpersonal roles and games, various cultural "healing" practices, personal and social aspects of illness, family disorganization, and hospitals and related institutions. (Equiv. to Behav. Med. & Psychiatry 355.)

363. **Personality Theory and Research.** I or II. 3 hr. PR: Psych. 263, 314, or equiv. Intensive analysis of current research and theory in the psychology of personality.

379. **Professional Problems in the Practice of Psychology.** I or II. 2 hr. PR: Consent. Current problems in the practice of clinical psychology.

381. **Behavior Pathology.** I or II. 3 hr. PR: Psych. 263, 281, and consent. Advanced study of etiology and dynamics of severe behavior pathology.

RELIGIOUS STUDIES PROGRAM

Faculty

Manfred O. Meitzen, Ph.D. (Harvard U.), *Chairman and Professor of Religious Studies.*

Ottomar F. Cypris, Th.D. (Union Theol. Sem.), *Assistant Professor of Religious Studies.*

Courses of Instruction

Religious Studies courses provide instruction in the field of man's experience concerning God, the transcendent, ultimate concern. Such studies include both the intellectual activity of man about this experience (theology) as well as his resultant deeds in worship and ritual, ethics, and history. Part of the curriculum is devoted to the study of the world's great scriptures. Another part deals with the history of religions. Another segment deals with contemporary religious thought. Another part probes into the interrelation of theology and culture. Throughout the Religious Studies Curriculum, attention is given to the relevance of the subject matter to the lives of the students at the time in which they are living. While religious studies offers no major, courses in religious studies may be taken for Core Curriculum credit as well as elective credit and are meant for the enrichment of the global, liberal arts education of the student.

Religious Studies

5. **An Introduction to Issues in Religious Studies.** I. 3 hr. (For freshmen only.) Introduction to the leading issues involved in religious studies. Issues covered will include transcendence, the God question, evil, redemption, community, eschatology, symbolism, ethics, examples of the relationship between religion and culture.

50. **Honors Course in Religious Studies.** 3 hr. Open only to honors students. A study of fundamental tenets of Judaism and Christianity; also an introduction to their Scriptures, their origin and growth as well as certain problems contained in them. The course will constantly strive to show the contemporary relevance of each topic discussed. Readings from great Christian and Jewish thinkers of all ages will be assigned weekly.

100. **Introduction to the Gospels.** I. 3 hr. A study of the four Gospels of the New Testament, involving a brief introduction to the literature and historical setting of the Gospels with an intensive study of the Christ event. The course discusses a number of basic theological issues; and it constantly relates the teaching of the Scriptures to the contemporary situation.

101. **A Study of Paul.** II. 3 hr. An introduction to the life and theology of Paul, involving a study of the letters of Paul and other pertinent early Christian literature. The course discusses a number of basic theological issues; and it constantly relates the teaching of the Scriptures to the contemporary situation.

102. **Introduction to the Old Testament.** I. 3 hr. A brief introduction to Old Testament literature, its historical background, its great personalities, and the development of beliefs and customs of importance both to Jews and to Christians. The development of Israel and her theology will be traced up to the eighth century B.C. The course discusses a number of basic theological issues; and it constantly relates the teaching of the Scriptures to the contemporary situation.

103. **Introduction to the Old Testament.** II. 3 hr. A brief introduction to Old Testament literature, its historical background, its great personalities, and the development of beliefs and customs of importance both to Jews and to Christians. The development of Israel and her theology will be traced from the eighth century B.C. until the time of Christ. The course discusses a number of basic theological issues; and it constantly relates the teaching of the Scriptures to the contemporary situation.

110. **Problems in Contemporary Judaeo-Christian Thinking.** I. 3 hr. PR: A previous religious studies course or consent. Problems to be treated include the following: the function of reason in the Judaeo-Christian faith and the relationship of reason and revelation to each other; the Judaeo-Christian understanding of history; a selected topic.

111. **Problems in Contemporary Judaeo-Christian Thinking.** II. 3 hr. PR: A previous religious studies course or consent. Problems to be treated include the following: the ecumenical movement within the Church; the Spirit; recent transformations in ethical and social thinking (new morality); secular theology (new theology).

112. **Judaeo-Christian Teachings About the Problems of Man.** I. 3 hr. PR: A previous religious studies course or consent. A presentation of the dialog between the existential problems of man, e.g., anxiety, loneliness, meaninglessness, guilt, death, lust, wrath, and others, and the response of the Judaeo-Christian faith. The course embraces an introduction to existential theology.

120. **History of Christian Thought.** I. 3 hr. A study of significant men and movements of thought among the Christians and of the way in which these contributed to answering the perennial questions of religion from a Christian perspective. The course will cover the history of Christian thought to 1500.

121. **History of Christian Thought.** II. 3 hr. A study of significant men and movements of thought among the Christians and of the way in which these contributed to answering the perennial questions of religion from a Christian perspective. The course will cover the history of Christian thought from 1500 to the present time.

123. **Roman Catholic Thought From the Council of Trent to Vatican Council II.** II. 3 hr. PR: A previous religious studies course or consent. Roman Catholic thinkers and movements in doctrinal, biblical, historical, and social thought; the reform and renewal movement of Vatican Council II; the role of Roman Catholicism in contemporary society.

124. **Christian Thought in the Reformation Era.** I or II. 3 hr. PR: A previous religious studies course or consent. Study of the significant men and movements in the four primary streams of sixteenth century Christian thought in western Europe: Protestantism, radical Christianity, Roman Catholicism, and Anglicanism.

126. **Early Medieval Theology and Culture.** I. 3 hr. PR: A previous religious studies course or consent. Study of the primary ways in which early medieval Christian thought responded to the cultural heritage of the West. Major consideration given to the rise of the medieval synthesis of theology and culture.

128. **History of American Religion: 1607-1820.** I. 3 hr. PR: A previous religious studies course or consent. Study of the origins, growth, and influence of the major religious ideas and movements which were significant in the shaping of the religious life of the American people in the colonial and early federal periods.

129. **History of American Religion: 1820 to Date.** II. 3 hr. PR: A previous religious studies course or consent. Study of the origins, growth, and influence of the major religious ideas and movements which have been significant in the shaping of the religious life of the American people since 1820.

130. **World Religions: Religions of India.** I. 3 hr. Proto-Indian religion, Hinduism, the beginnings of Buddhism, Jainism, Sikhism; historical and theological foundations; developments of thought; contemporary expressions and encounter with modern world.

131. **World Religions: Religions of China and Japan.** II. 3 hr. Buddhism, Confucianism, Taoism, Shinto: historical and theological foundations, developments of thought; contemporary expressions and encounters with the modern world.

140. **Theology and Culture.** I. 3 hr. PR: A previous religious studies course or consent. An interdisciplinary course involving members of various parts of the faculty of the University in dialog with a professor of religious studies. The dialog will be carried on with the humanities and the arts.

141. **Theology and Culture.** II. 3 hr. PR: A previous religious studies course or consent. An interdisciplinary course involving members of various parts of the faculty of the University in dialog with a professor of religious studies. The dialog will be carried on with science and technology.

290. **Seminar: Selected Topic.** 3 hr. PR: A previous religious studies course or consent.

291. **Seminar: Selected Topic.** 3 hr. PR: A previous religious studies course or consent.

SOCIAL SCIENCE

Soc. Sci.

1, 2. **Introductory General Course.** I, II. 3 hr. per sem. The interdisciplinary course in social science aids the student in his preparation for citizenship by advancing his understanding of the social order. The heart of the course is an analysis of selected critical social issues. These may be environment, American race relations, poverty. Guest lecturers, films, and discussion groups.

191. **Special Topics.** I, II. 1-6 hr. PR: Consent.

SOCIOLOGY

Faculty

Arnold J. Levine, Ph.D. (Columbia U.), *Chairman and Professor.*
Ronald C. Althouse, Ph.D. (U. Minn.), *Associate Professor.*
Richard A. Ball, Ph.D. (Ohio St. U.), *Associate Professor.*
H. Russell Bernard, Ph.D. (U. Ill.), *Associate Professor of Anthropology.*
Harold A. Gibbard, Ph.D. (U. Mich.), *Professor.*
John T. Griffin, Ph.D. (U. Mo.), *Assistant Professor.*
David S. Hall, Ph.D. (U. Ky.), *Associate Professor.*
Jiri T. Kolaja, Ph.D. (Cornell U.), *Professor.*
John D. Lozier, Ph.D. (U. Minn.), *Assistant Professor of Anthropology.*
Ann L. Paterson, Ph.D. (Mich. St. U.), *Assistant Professor (part-time).*
John D. Photiadis, Ph.D. (Cornell U.), *Professor.*
Patricia C. Rice, M.A. (Ohio St. U.), *Instructor (part-time) in Anthropology.*
John Schnabel, Ph.D. (U. Notre Dame), *Assistant Professor.*
Joseph J. Simoni, M.A. (U. Notre Dame), *Assistant Professor.*
Leonard M. Sizer, Ph.D. (U. Iowa), *Associate Professor.*
Roger Trent, M.A. (U. Wash.), *Lecturer.*
Neil J. Weller, Ph.D. (U. Mich.), *Assistant Professor.*

Field of Study

Sociology and anthropology courses constitute an important part of a general liberal education. They foster an awareness of the structure of human societies and of the social processes which operate in all groups, organizations and institutions. The student is exposed to the methods of inquiry that sociology and anthropology have in common as well as to special knowledge and insights of the two disciplines. Courses in the department also are intended to facilitate the application of sociological and anthropological principles to the wide range of contemporary social problems. Undergraduate training in the department is particularly relevant for students in psychology, political science, economics, social work, education, communications, and the humanities. Sociology and anthropology now also constitute an important part of the undergraduate education for those pursuing a career in law, health professions and engineers and others concerned with environmental and ecological problems. Undergraduate training in sociology is relevant to careers in the teaching of the social sciences, applied research with governmental agencies and community development and planning. A student who majors in sociology is also equipped to pursue further graduate training in sociology or anthropology in pursuit of an academic career in teaching and research.

Requirements for a Major

A student majoring in sociology normally will elect to take either Sociol. 1 or 51 during his freshman year. Sociol. 101 is required and should be taken in the First Semester of the junior year. Also required are Sociol. 201, 211 and 15 additional hours of upper-division sociology courses and Stat. 101.

An undergraduate major with a *concentration* in anthropology also is offered. The training is similar, differing principally in the cross-cultural emphasis which would enhance the students' preparation for work in societies and cultures other than their own. Required courses are: Sociol. 101, 152, 211, a course in anthropological theory, a course in field methods, 9 additional hours of upper-division anthropology courses, and Stat. 101.

As a guide for selecting electives, the Department's upper-division course offerings may be grouped into the following broad fields:

I. Sociological Theory: Sociol. 101, 201
II. Research Methods: Sociol. 211
III. Demography: Sociol. 241
IV. Social Organization: Sociol. 121, 135, 204, 205, 231, 232, 233
V. Community: Sociol. 122, 131, 222, 223
VI. Social Change: Sociol. 240, 251, 253
VII. Social Disorganization: Sociol. 132, 133
VIII. Social Psychology: Sociol. 203, 221, 252, 260
IX. Anthropology: Sociol. 151, 152, 154, 155, 156, 158, 251, 252, 253

Courses of Instruction in Sociology

Professors Levine (*Chairman*), Gibbard, Kalaja, and Photiadis; Associate Professors Althouse, Ball, Bernard, Hall, and Sizer; Assistant Professors Griffin, Lozier, Paterson (part-time), Schnabel, Simoni, and Weller; Instructor Rice (part-time); Lecturer Trent.

Sociol.

Lower Division

1. **Introduction to Sociology.** I, II, S. 3 hr. A basic course intended to develop a perspective about the nature of social processes and the structure of society.

51. **Introduction to Anthropology.** I, II, S. 3 hr. Course covers the essentials of human evolution and culture history. It also considers the varieties of languages and cultures found among peoples of the world.

71. **Social Problems.** I, II. 3 hr. Examination of the causes of social disorganization in modern society. Particular attention is paid to such contemporary concerns as drug and alcohol abuse, mental illness, family conflict and crime.

Upper Division

Prerequsite for Sociology courses in the 100 series is Sociol. 1 or 51 or departmental consent.

101. **Principles of Sociology.** I, II. 3 hr. Systematic presentation of the major concepts used in the study of society and social life. Strong emphasis on research findings derived from studies of contemporary American society.

121. **The Family.** I, II. 3 hr. Comparative approach to the changing structure and functions of the family institution. The effect of economic, demographic, and cultural changes on male-female relationships, sex roles, marriage and childcare is discussed.

122. **The Community.** II. 3 hr. Social structure of small towns and rural communities is examined. The community power structure and political participation as they relate to community planning is a major focus.

131. **Urban Sociology.** I or II. 3 hr. The ecological, demographic and socio-cultural patterns of cities and their hinterland. Racial and ethnic neighborhoods of the inner-city will be studied as will the process of suburbanization.

132. **Criminology.** I, II. 3 hr. Nature, extent, and causal explanation of the forms of juvenile delinquency. Particular attention is given to the nature of juvenile courts and the correctional system and to prevention programs.

135. **Race and Ethnic Relations.** I. 3 hr. Causes and consequences of prejudice and discriminatory practices involving minority group members is examined. Primary emphasis on blacks but the social and economic conditions of Chicanos, Indians, and other ethnic and religious minorities will be discussed.

151. **Introduction to Ethnology.** I. 3 hr. Descriptive course on the peoples and cultures of the world with a focus on pre-industrial societies.

152. **Introduction to Physical Anthropology.** II. Course examines: the fossil evidence for human evolution; human racial variation; and the relationship between biology and human behavior.

154. **Anthropology of War and Aggression.** I or II. 3 hr. PR: Sociol. 51 or consent. Critical examination of biologically based conceptions of human aggression. Presents socio-cultural account of human violence and warfare as an instrument for accomplishing goals, and as a valued form of personal behavior.

155. **Latin American Society and Culture.** I or II, or S. 3 hr. Examination of anthropological evidence of what is "Latin" (Spanish) and what is "American" (Indian) about Latin American society and culture today. Emphasis on the pre-historic and colonial experience.

156. **African Society and Culture.** I or II. 3 hr. Survey of the peoples and cultures of Black Africa including the impact of colonialism on the region.

159. **Introduction to Archaeology.** II. 3 hr. Survey of prehistoric cultures of the world and the methods used in reconstructing them.

Sociol. 1, 51, 101 or departmental consent is a prerequisite for all courses in the 200 series.

201. **Sociological Theory.** I, II. 3 hr. Systematic analysis of major sociological theories viewed both from a historical perspective and in terms of current research developments.

203. **Collective Behavior.** I or II. 3 hr. Analysis of riots, demonstrations, crowd and mob behavior and other forms of social contagion; behaviors following natural disasters and social unrest are also studied.

204. **Complex Organizations.** I or II. 3 hr. Examination of the structure and functioning of large-scale, bureaucratic organizations. Studies of industrial

organizations, prisons, hospitals, government bureaus and the military in contemporary society are emphasized.

205. **Social Stratification.** I, II. 3 hr. Various systems of social inequality are analyzed; major emphasis on empirical studies describing the social class system, distribution of status and power, and patterns of social mobility in American society.

211. **Introduction to Research Methods.** I, II. 3 hr. The course will stress the logic of social research, the elements of research design, and the problems of measurement. An emphasis is placed on survey research methodology and data analysis.

221. **Sociology of Childhood.** I, II. 3 hr. Survey of theory and research on socialization processes in the family, peer group and community including comparative study of child-rearing practices among different regions, social classes, and ethnic groups.

222. **Principles of Community Development.** I. 3 hr. Application of sociological knowledge of the structure of communities for the planning of programs and services. Particular emphasis on the techniques of organizing efforts for community change.

223. **Sociology of Rural Life.** I or II. 3 hr. Social aspects of rural living. Characteristics of rural population, social structure, and institutional arrangements: family, community, education, religion, recreation, health, welfare, and local government.

231. **Society and Health.** I. 3 hr. Study of health and illness behavior and of the social organization of the health professions. Attention to the problems of health-care delivery systems in the U.S. and in developing areas.

232. **Sociology of Education.** I, II. 3 hr. Examination of education as a social institution; cultural and class influences on education; social roles and career patterns in the school system; the school and problems of the community.

233. **Industrial Sociology.** I or II. 3 hr. Cross-cultural studies of work and of the structure and functioning of industrial organizations.

240. **Social Change.** I or II. 3 hr. Sociological analysis of the major changes now going on in our society, of the forces underlying them, and of the tensions to which they give rise. Alternative future directions; rational manipulation and planning for social change.

241. **Population and Society.** I or II. 3 hr. Introduction to demographic analysis focusing on the social causes and consequences of variations in fertility, morbidity, mortality and migration. National and state population policies are also considered.

251. **Cultural Dynamics.** I. 3 hr. Nature of culture and how it changes. Natural environmental changes, culture-contact, economic and population pressures are among the factors discussed.

252. **Culture and Personality.** I, II. 3 hr. The study of how different cultures shape the personalities of their members. Concepts such as modal personality and national character are introduced.

253. **Cross-cultural Studies in Development.** I or II. 3 hr. Comparative study of the processes of change in societies in the early stages of industrialization.

260. **Social Structure and Personality.** I, II. 3 hr. Interaction between society and the individual's behavior is examined. Key concepts are social role and the social self; a major focus of the course is on adult experiences and adult socialization.

290. **Special Topics.** I, II. 3 hr. PR: Consent of Department Chairman or instructor. (May be repeated for a max. of 9 hr.) A seminar primarily for department majors on issues and problems of current concern.

291. **Honors Seminar.** I, II. 3 hr. PR: Honors standing in sociology. Seminar devoted to the study of a topic of importance in sociology and anthropology.

SPEECH COMMUNICATION

Faculty

James C. McCroskey, Ed.D. (Penn. St. U.), *Professor; Chairman.*
Michael Burgoon, Ph.D. (Mich. St. U.), *Associate Professor.*
Leonard M. Davis, Ph.D. (Northwestern U.), *Professor.*
M. Lucille DeBerry, M.A. (U. Iowa), *Instructor.*
Betty Snyder Hall, M.A. (WVU), *Assistant Professor.*
H. Thomas Hurt, Ph.D. (Ohio U.), *Assistant Professor.*
William B. Lashbrook, Ph.D. (Mich. St. U.), *Professor.*
Enid Fortnoy, M.A. (Northwestern U.), *Assistant Professor.*
Walter H. Rockenstein, Ph.D. (Northwestern U.), *Associate Professor.*
Charles Russell, Ph.D. (SIU), *Assistant Professor.*
John Shibley, Ph.D. (Ohio St. U.), *Associate Professor.*
Lloyd W. Welden, Sr., M.A. (U. Mo.), *Professor Emeritus.*
Lawrence Wheeless, Ph.D. (Wayne St. U.), *Assistant Professor.*

Curriculum

The Department of Speech Communication offers a curriculum designed to meet the needs of liberal arts and pre-professional students. The undergraduate curriculum focuses upon the application of theory and research in human communication to a variety of personal and social settings.

In addition a major and a minor in speech communication is available for students wishing to pursue in-depth study in the field. The major and minor provide: (1) general core of basic theory, research, and application, plus (2) flexibility in electives which allows the major to emphasize course work in a particular area. Emphasis in the major is designed to supply a background useful for those anticipating futures in teaching, organizations and institutions, mass communication, professional schools, or graduate study. (Those students anticipating teaching must also fulfill certification requirements of the State Board of Education.)

Requirements for Major or Minor

General Requirements. The minimum requirement for a major in speech communication is 36 semester hours of credit (18 hours must be in upper-

division courses). The minimum requirement for a minor is 24 semester hours of credit. A total of 42 hours in speech communication may be counted toward graduation.

Required Courses. The following core of courses is required of all majors and minors: Sp. Com. 11, 111, 133, 160, and 180. Students should choose electives from offerings in the Department to complete minimum semester hours of credit required for the major (36 hours) or minor (24 hours).

Recommended Courses. The following courses are recommended departmental electives for majors and minors wishing to emphasize interpersonal communication: Sp. Com. 106, 107, 131, 221, 231, and 375, plus additional 300-level courses.

The following courses are recommended departmental electives for majors and minors wishing to emphasize mass communication: Sp. Com. 80, 106, 107, 221, 281, and 372.

The following courses are recommended departmental electives for majors and minors wishing to emphasize organizational and institutional communication or who seek a pre-professional background in communication: Sp. Com. 80, 106, 107, 109, 131, 221, 231, and 376.

Recommendations for Other Coursework

Majors, especially freshmen and sophomores, should consult the requirements for the B.A. on page 106. Recommendations for courses and minors that complement a major in speech communication and which fulfill College of Arts and Sciences requirements can be secured by consulting the Academic Advising Center (freshmen and sophomores) or academic advisers in the Department (juniors and seniors). Majors and minors are asked to consult carefully with advisers in planning courses of study.

Recommended Courses in University Core Requirements. The following courses are recommended to majors for fulfilling University Core Curriculum requirements for graduation: (Group A, 12 hr.) Phil. 1, 51, 104, 158, 185; (Group B, 12 hr.) Econ. 51, 241, 245, 262, Pol. Sci. 140, 214, 232, 295, 343, Psych. 1, 2, 101, 121, 122, 123, 151, 253, 262, 263, 311, 314, 351, 352, Sociol. 1, 131, 203, 204, 211, 233, 240, 253; (Group C, 12 hr.) Biol. 1, 2, Geol. 2, 5, Stat. 101, 201, 213, 214, 231, 311, 341.

Recommended Minors and Electives for Speech Communication Majors. Majors in speech communication are advised (not required) to pursue a minor concentration or electives in an area(s) related to their emphasis or interests. The following are recommended for consideration: journalism, business, psychology, sociology, philosophy, and political science.

Forensic Program

The Department of Speech Communication offers an active forensic program for interested students in the University. The program emphasizes intercollegiate and on-campus debate. Students travel nationwide to debate tournaments and participate in various campus and regional activities. Active participation in forensics normally leads to membership in Delta Sigma Rho-Tau Kappa Alpha, forensic honor society.

Courses of Instruction in Speech Communication

Professors McCroskey (*Chairman*), Davis, and Lashbrook; Associate Professors Burgoon, Rockenstein, and Shibley; Assistant Professors Hall, Hurt, Portnoy, Russell, and Wheeless; Instructor DeBerry.

Sp. Com.

Lower Division

11. **Principles of Human Communication.** I, II, S. 1 hr. PR or Conc.: Sp. Com. 12, 13, or 14. Introduction to the human communication process with emphasis on the principles, variables, and social contexts of communication.

12. **Human Communication in the Interpersonal Context.** I, II, S. 2 hr. PR or Conc.: Sp. Com. 11. Introduction to interpersonal communication with emphasis upon application of one-to-one communication in a variety of social contexts.

13. **Human Communication in the Small Group.** I, II, S. 2 hr. PR or Conc.: Sp. Com. 11. An introduction to small group communication with emphasis upon application in a variety of social contexts.

14. **Human Communication in the Public Communication Context.** I, II, S. 2 hr. PR or Conc.: Sp. Com. 11. Introduction to the principles of communication in the one-to-many context with application in public speaking settings. (Credit not counted toward major in speech communication.)

21. **Human Communication in a Contemporary Society.** I, II, S. 3 hr. Introduction to principles of communication and decision making on significant issues in a free society with emphasis upon topics such as freedom of speech and press.

60. **Practicum in Debate.** I, II. 1 hr. (repeatable to 4 hr. total). PR: Consent. Experience and training in rational debate with emphasis upon intercollegiate and on-campus debating.

80. **Introduction to Broadcasting.** I, II, S. 3 hr. Historical development of broadcasting, its responsibilities, and role in today's society. Consideration of organization of stations, their relation to networks, federal regulations, industry codes, broadcasting research, and contemporary problems. (Also listed as Journ. 80.)

81. **Practicum in Mass Communication.** I, II, S. 1 hr. (repeatable to 4 hr. total). PR: Sp. Com. 80. Open only to majors and minors in speech communication. Experience and training in media skills in out-of-class assignments to various supervised production centers in the University and community.

Upper Division

105. **Special Topics in Human Communication.** I, II, S. 3 hr. PR: Sp. Com. 11 (repeatable to 6 hr. total). Special topics in human communication such as communication and conflict resolution, the role of communication in negotiation and bargaining, contemporary communication criticism, issues in the communication field, etc.

106. **Nonverbal Communication.** I, II, S. 3 hr. PR: Sp. Com. 11. Introduction to nonverbal messages and codes with attention to the communication effects

of time, space, kinetics, touch, objects, social contexts, and physical surroundings.

107. **Communication and Rational Decision.** I, II. 3 hr. Application of the theories of argumentation and persuasion to the process of rational decision-making with emphasis upon critical response to persuasive communication.

108. **Nonviolence in Communication Behavior.** I. 3 hr. Introductory study of nonviolent resistance as communication behavior. Emphasis on major proponents of and upon learning ways to apply nonviolence in communication behavior.

109. **Communication in Organizations and Institutions.** I, II, S. 3 hr. PR: Sp. Com. 11. Study of communication processes and problems in business and nonbusiness organizations and institutions with attention to practical application.

111. **Human Communication and Social Change.** I, II, S. 3 hr. Introduction to the process of communication in the societal setting with emphasis upon the communication of innovations, diffusion of information, and adoption of change.

131. **Human Communication and Language Behavior.** I, II, S. 3 hr. Introduction to the production and use of language with emphasis on linguistic, psychological, sociological, and developmental perspectives on language in human communication.

133. **Interpersonal Communication.** I, II, S. 3 hr. PR: Sp. Com. 11. Survey of the theoretical and research literature in interpersonal communication.

160. **Communication Research Methods.** II. 3 hr. PR: Sp. Com. 11, 12 hr. in speech communication, or consent. Introduction to research methods in the field of human communication with emphasis on experimental procedures, design, analysis, and interpretation.

161. **Directed Studies in Human Communication.** I, II, S. 3 hr. (repeatable to 6 hr.) PR: Sp. Com. 11 and consent. Directed communication study and research in special areas of human communication.

175. **Communication of the Black Movement.** II. 3 hr. PR: Consent. Study of critical rhetorical strategies used by blacks and whites as they relate to past and present racial conditions in America. Emphasis on analyzing rhetorical styles and effects of DuBois, Garvey, Garrison, Tubman, King, and Malcom X.

180. **Effects of Mediated Communication.** I, II, S. 3 hr. PR: Sp. Com. 11. Study of the messages and characteristics of mass media with emphasis upon the effects of mass communication on society.

187. **Appreciation of the Motion Picture.** I, II. 3 hr. Viewing lab. Introduction to the appreciation of the motion picture and the television film as art forms. Principles of aesthetics involved in evaluating films. Attention given to the various types of films: art films, documentary, entertainment, experimental, instructional, etc. Weekly viewing and evaluation sessions. (Also listed as Journ. 187.)

201. **Principles of Communication Education.** I, II, S. 3 hr. PR: 15 hr. in speech communication. Study of the literature, principles, and current practices of communication education in the public schools with directed application. Planned to serve the needs of teachers in the fields of communication and language arts.

202. **Directing the Forensic Program.** II, S. 1-3 hr. PR: Sp. Com. 107. Study of the principles and techniques of administering a forensic program, tournament direction, and conducting extracurricular activities.

221. **Persuasion.** I, II, S. 3 hr. PR: Sp. Com. 11. Theory and research in persuasion, organizational influence, and communication of innovations with attention to application in classroom and out-of-class projects.

230. **Survey of Rhetorical-Communication Theory.** I. 3 hr. PR: Sp. Com. 11. A survey of theory in the rhetorical communication context with emphasis upon periods preceding the twentieth century.

231. **Communication and Symbol Analysis.** I, II. 3 hr. Study of the relationships among language, thought, and action. Specific attention to how people use and react to language.

275. **Communication Problems of Children.** I, II. 3 hr. PR: Sp. Com. 11. Primarily for elementary and secondary school teachers and language arts supervisors. Normal maturational development of listening and speaking skills, their relationships to language acquisition, their influence upon achievement.

281. **Media in Communication and Education.** I, II. 3 hr. Introduction to the use of the media in educational and other communication environments with emphasis upon the communication process and principles relevant to television and film.

370. **Psychology of Speech.** II. 3 hr. PR: Consent. Modern psychological principles of speech learning and usage. Influences of emotion, conditioning, and habit formation on listening, thinking, language, and personality factors in oral communication.

371. **Theory and Research in Language.** I, II, S. 3 hr. Advanced study of syntactics, semantics, and pragmatics of language behavior. Includes analyses of contemporary linguistic theories.

372. **Theory and Research in Mass Communication.** I, II, S. 3 hr. Major emphasis on theories of mass communication from a consumer's viewpoint. The use of consumer-oriented mass media research is also stressed.

373. **Theory and Research in Persuasion.** I, II, S. 3 hr. Study of various theories and principles of persuasion with emphasis on contemporary research literature.

374. **Theory and Research in Intercultural Communication.** I, II, S. 3 hr. Advanced seminar in communication and change in various cultures. Special emphasis on research in the diffusion of innovations as well as special topics such as communication strategies for population control, communication of technical information, etc. in the developing countries.

376. **Theory and Research in Organizational Communication.** I, II, S. 3 hr. Examination of the contemporary research linking communication variables and networks to organizational change, effectiveness, leadership, power, and management practices. Includes the analysis of communication problems within a variety of organizations.

377. **Theory and Research in Interpersonal and Small Group Communication. I, II,** S. 3 hr. Study of specific research areas in interpersonal communication with intensive emphasis on interpersonal communication in small groups.

STATISTICS AND COMPUTER SCIENCE

Faculty

Stanley Wearden, Ph.D. (Cornell U.), *Chairman and Professor of Statistics.*
Donald F. Butcher, Ph.D. (Iowa St. U.), *Associate Professor of Statistics.*
Daniel M. Chilko, Ph.D. (Rutgers U.), *Assistant Professor of Statistics.*
Shirley M. Dowdy, Ph.D. (U. Notre Dame), *Assistant Professor of Statistics.*
Stanley Etersque, M.A.T. (Duke U.), *Instructor (part-time) in Computer Science.*
Mary Ellen Haddad, M.S. (Purdue U.), *Instructor (part-time) in Computer Science.*
Judith C. Hall, M.S. (Harvard U.), *Instructor in Statistics.*
E. James Harner, Ph.D. (Cornell U.), *Assistant Professor of Statistics.*
E. Salah E. Galal, Ph.D. (Iowa St. U.), *Visiting Assistant Professor of Statistics.*
John C. Knight, Ph.D. (Newcastle-upon-Tyne U.), *Visiting Assistant Professor of Computer Science.*
John M. Krall, Ph.D. (U. Iowa), *Assistant Professor of Biostatistics.*
Malcolm G. Lane, Ph.D. (Duke U.), *Assistant Professor of Computer Science.*
Wayne A. Muth, Ph.D. (Iowa St. U.), *Professor of Computer Science.*
Carl E. Ortmeyer, Ph.D. (Iowa St. U.), *Assistant Professor of Statistics.*
David C. Rine, Ph.D. (U. Iowa), *Assistant Professor of Computer Science.*
Phillip D. Stark, M.S. (U. Mo.), *Instructor in Statistics.*
Edwin C. Townsend, Ph.D. (Cornell U.), *Associate Professor of Statistics.*
George E. Trapp, Jr., Ph.D. (Carnegie-Mellon U.), *Assistant Professor of Computer Science.*
Vincent A. Uthoff, Ph.D. (U. Iowa), *Associate Professor of Statistics.*

Aims and Objectives

The Bachelor of Science degree is designed to qualify a student for professional positions in industry, research, or government service. At the same time it prepares him for graduate study in his own discipline or in some other academic area of quantitative science. The Bachelor of Arts degree is not awarded with a major in statistics or in computer science.

Statistics Program

The field of statistics presents methods of making decisions on the basis of probabilty. The baccalaureate program in statistics is intended to train a student to combine the scientific method with mathematics and inductive reasoning in order to serve on a research team as a member who can design experiments, analyze the results and draw inference from them.

A student interested in a career in actuarial science should so inform the department after successful completion of Math. 17 and Stat. 262. At that time he can be nominated as qualified to take Part 1 and Part 2 of the actuarial examinations sponsored by the Society of Actuaries.

Statistics majors must complete 24 hours of statistics, computer science and/or mathematics beyond calculus. These must include 6 hr. each in statististical methods, statistical theory, and applied statistics.

SUGGESTED SCHEDULE FOR STATISTICS MAJORS

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3
Foreign Lang.	3	Foreign Lang.	3
Math. 15	4	Math. 16	4
Phys. Ed. 1	1	Phys. Ed. 2	1
Core A or B*	3-8	Core A or B	3-8
	14-19		14-19

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Foreign Lang.	3	Foreign Lang.	3
Math. 51	4	Math. 163	3
C.S. 1	3	Stat. 101	3
Core A or B	3	Core C	4
Core C (Lab Sci.)	4	Core A or B	3-5
	17		16-18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Stat. 201	3	Stat. 215	2
Stat. 261	3	Stat. 262	3
Math. 251	3	Math. 252	3
Core A or B	0-3	Core A or B	0-3
Electives	6	Electives	6
	15-18		14-18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Stat. 231	3	Stat. or C.S. electives	6
Stat. or C.S. electives	6	Electives	12
Electives	9		
	18		18

*Before completing the fourth year, 12 hours (not including major courses) must be taken in Core A and 12 in Core B.

Required courses: Math. 15, 16; 17 or 51; Stat. 101 or 311; 201 or 312; 261 or 361; 262 or 362; 215, 231, 291, 321, 333, 341, 342.

Suggested electives: Econ. 51, 52; Mgmt. 111, 112; C.S. 1, 30 (2), 101, 107 (160), 120; Math. 163, 241, 251, 252, 291, 292.

Courses of Instruction in Statistics

Professors Wearden (*Chairman*) and Muth; Associate Professors Butcher and Townsend; Assistant Professors Chilko, Dowdy, Galal, Knight, Krall, Lane, Ortmeyer, Rine, Trapp, and Uthoff.

Stat.

101. **Elementary Statistical Inference.** I, II. 3 hr. PR: Math. 3. Basic concepts of statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression, correlation, chi-square and index numbers. (Equiv. to Econ. 125.)

201. **Intermediate Statistical Methods.** II. 3 hr. PR: Stat. 101. Extension of basic concepts of statistical models, elementary decision theory, estimation, random variable, one- and two-way classification models, analysis of variance, F-distribution, time series, seasonal and cyclical movements, simple and multiple linear regression and correlation analysis. (Equiv. to Econ. 226.)

213. **Basic Statistical Analysis 1.** I, II. 3 hr. PR: Math. 16. Measures of central tendency and variation, probability, sampling probability distributions, inference, tests of hypotheses, confidence intervals, analysis of variance, simple linear regression and correlation, and enumeration statistics. (Equiv. to I.E. 213.)

214. **Basic Statistical Analysis 2.** I, II. 3 hr. PR: Stat. 213 or equiv. Single and multi-factor experimental designs; fixed, mixed and random effect models; split plot designs; multilinear and nonlinear regression and correlation analyses; and analysis of covariance. (Equiv. to I.E. 214.)

215. **Statistical Computer Techniques.** II. 2 hr. PR: C.S. 1 or I.E. 181 and pre- or corequisite Stat. 201, or consent. Extension of concepts and skills related to using digital computers for statistical analysis. In addition to programming statistical analyses and elementary simulation in the FORTRAN language, programs available in the Computer Center Statistical Program Library will be utilized.

231. **Sampling Methods.** I. 3 hr. PR: Introductory course in statistics. Methods of sampling from finite and infinite populations, choice of sampling unit, sample survey design, estimation of confidence limits and optimum sample size, and single and multi-stage sampling procedures.

261. **Statistics and Probability 1.** I. 3 hr. PR: Math. 16. Probability, discrete and continuous probability distributions, expectations, sums of random variables, sampling distributions, point and interval estimation, tests of hypotheses.

262. **Statistics and Probability 2.** II. 3 hr. PR: Stat. 261. Statistical inference and decision theory; properties of hypotheses; bivariate and mutivariate distributions; least squares procedures.

291. **Special Topics.** I, II, S. 1-6 hr. Advanced study of special topics in statistics.

311. **Statistical Methods 1.** I, II. 3 hr. PR: Math. 3. Basic concepts of statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression correlation, transformations, F and X^2 distributions, analysis of variance for one- and two-way classification models, multiple range tests, missing plots, and sample size. (Equiv. to Psych. 311 and Ed. Psych. 311.)

312. **Statistical Methods 2.** I, II. 3 hr. PR: Stat. 201, 213, or 311. Extension of basic concepts of statistical models, design of experiments, multiway classification models, factorials, split plot design, simple covariance, orthogonal comparisons, multiple linear and nonlinear regression and correlation analysis, chi-square, and non-parametric statistics. (Equiv. to Psych. 312 and Ed. Psych. 312.)

321. **Design of Experiments.** I. 3 hr. PR: Stat. 214 or 312. Extension of basic concepts of statistics to the more complicated models and use of samples, design and analysis of experiments over time and space, fractional replications, incomplete block designs, cross-over designs, lattice designs, and least squares analysis for designs with unequal subclass numbers.

333. **Nonparametric Statistics.** II. 3 hr. PR: Introductory course in statistics. Single sample tests; tests for related samples, two independent samples, k related samples, k independent samples; and measures of correlation.

341. **Multivariate Methods 1.** I. 3 hr. PR: Stat. 201, 213, or 311. Introduction to elementary matrix operations, partial and multiple linear and non-linear correlation and regression analyses, and introduction to discriminant analysis. (Equiv. to Psych. 315.)

342. **Multivariate Methods 2.** II. 3 hr. PR: Stat. 341 or equiv. This course includes a discussion of the multivariate normal distribution, tests of hypotheses about the sample mean vectors and variance-covariance matrices from a multivariate normal distribution, and analysis of variance of multiple responses in basic statistical designs.

361. **Theory of Statistics 1.** I. 3 hr. PR: Math. 51. Probability and random variables, univariate and multivariate probability distributions, expectations, moments, marginal and conditional distributions, independence, correlation, transformations, and functions of random variables.

362. **Theory of Statistics 2.** II. 3 hr. PR: Stat. 361. Estimation including bias, consistency, efficiency and sufficiency, hypothesis testing, distribution-free problems, order statistics, linear models and analysis of variance, and special distributions.

390. **Advanced Study in Statistics.** I, II, S. 1-6 hr. PR: Consent. Investigation in advanced statistics subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

Computer Science Program

The program in computer science is intended to train a student to act as a human intermediary between a computational problem and a high speed electronic computer. To operate in that capacity, he will need course work concerning (1) the representation and transmission of information, (2) the computer and its supporting systems, and (3) computer methodologies. At least 6 semester hr. of course work should be taken in each of these areas. Computer science majors are required to complete 24 hr. of upper-division course work in computer science, mathematics, or statistics. Among these must be C.S. 101, 107, and 120.

SUGGESTED SCHEDULE FOR COMPUTER SCIENCE MAJORS

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Foreign Lang.	3	Foreign Lang.	3
Foreign Lang.	3	Foreign Lang.	3	Math. 51	4	C.S. 107	3
Math. 15	4	Math. 16	4	C.S. 101	3	C.S. 120	3
C.S. 1	3	C.S. 30	3	C.S. 112	3	Stat. 101	3
Phys. Ed. 1	1	Phys. Ed. 2	1	Electives	3-6	Electives	3-6
Elective*	3-4	Elective	3-4				
	17-18		17-18		16-19		15-18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
C.S. 230	3	C.S. 212	3	C.S. 240	3	Stat. 215	2
Stat. 201	3	C.S., Math.,		C.S., Math.,		C.S., Math.,	
Math. 215	3	or Stat.	3-6	or Stat.	3-6	or Stat.	6-9
Electives	6-9	Electives	6-9	Electives	6-9	Electives	3-6
	15-18		15-18		15-18		14-17

*From these electives, 12 hours (not including major courses) must be taken in Core A and 12 hours in Core B.

Required courses: C.S. 1, 30 (2), 101, 107 (160), 120; and 9 hr. from following: C.S. 212, 220, 230, and 240; Math. 15, 16; 17 or 51; Stat. 101.

Suggested electives: Econ. 51, 52; Mgmt. 111, 112; C.S. 112, 330, 340, 390; Stat. 201, 215; Math. 163, 241; I.E. 283, 284; E.E. 271.

Courses of Instruction in Computer Science

Lower Division

C.S.

1. **Introduction to Computer Science.** I, II. 3 hr. Algorithms, programs and computers. Organization and characteristics of computers. Basic programming structure.

30. **Computer Language Concepts.** I, II. 3 hr. PR: C.S. 1 or equiv. Problem oriented and machine oriented languages and their uses. Programming in scientific, business and assembly languages.

Upper Division

101. **Computers and Programming.** I. 3 hr. PR: C.S. 1. Basic computer organization, machine language programming and the use of assembly language programming systems. Micro-programming, macro definition and generation, program segmentation and linkage.

107. **Data Management.** II. 3 hr. PR: C.S. 1. Programming methodology for processing large quantities of data. Job control language, utility programs, data storage and retrieval. Writing efficient programs to solve complex problems.

112. **Introduction to Discrete Structures.** I. 3 hr. PR: C.S. 1. Basic set algebra, algebraic structures, Boolean algebra and propositional logic. Directed and undirected graphs. Applications of these structures to various areas of computer science.

120. **Numerical Calculus.** II. 3 hr. PR: C.S. 1, Math. 51. Introduction to the numerical algorithms fundamental to scientific computing. Includes discussion of error, polynomial interpolation, quadrature, linear systems of equations, and nonlinear equations. The algorithmic approach and the efficient use of the computer are emphasized. (Equiv. to Math. 131.)

212. **Data Structures.** II. 3 hr. PR: C.S. 101, 112, or consent. Basic concepts of data. Structures of storage media and machines. Methods of representing structured data in storage and techniques for operating on it.

220. **Numerical Analysis 1.** I. 3 hr. PR: Math. 17, C.S. 120, or consent. Solutions of equations, interpolation and approximations. Numerical differentiation and integration. Numerical solution of initial value problems in ordinary differential equations. (Equiv. to Math. 220.)

221. **Numerical Analysis 2.** II. 3 hr. PR: Math. 17, C.S. 120, or consent. Solutions of linear systems by direct and iterative methods. Matrix inversion, evaluation of determinants, and calculation of eigenvalues and eigenvectors of matrices. Application to boundary value problems in ordinary differential equations. (Equiv. to Math. 221.)

230. **Programming Languages.** I. 3 hr. PR: C.S. 101, 112, or consent. Formal definition of programming languages including specification of syntax and semantics. Structure of simple statements and algorithmic languages. List processing and string manipulation languages.

240. **Systems Programming.** I. 3 hr. PR: C.S. 212, 230, or consent. Software organization for the support of computer components. Addressing techniques process and data modules, file system organization and management. Traffic control and communication with peripheral devices.

291. **Special Topics.** I, II, S. 1-6 hr. PR: Consent. Advanced study of special topics in computer science.

301. **Computers in Research 1.** I, S. 3 hr. Computer science majors cannot take this course for credit. The use of computers in research. Organization and characteristics of computers. Algorithms, machine language programming, scientific oriented language programming subprograms, program segmentation, and linkage.

302. **Computers in Research 2.** II. 3 hr PR: C.S. 301. Computer science majors cannot take this course for credit. Computer techniques in research. Data retrieval, scientific and business data processing, survey methods. Simulation and simulation languages. Formal definition of programming languages.

330. **Design of Language Processors.** II. 3 hr. PR: C.S. 230. Study of design and construction of automatic programming language processors. Investigation of the structure of scientific and business oriented compilers, list processors, and information processing languages.

340. **Design of Programming Systems.** II. 3 hr. PR: C.S. 240. Design of monitor systems, executive systems and operating systems for high speed digital computers. Emphasis on current generation computers with multiprogramming, interactive, teleprocessing, and real time capabilities.

390. **Advanced Study in Computer Science.** I, II, S. 1-6 hr. PR: Consent. Investigation in advanced computer science subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

Leading businessmen and industrialists participate in lecture-panel discussions in the College of Business and Economics.

Use of computer terminal in the College of Business and Economics.

College of Business and Economics

Business is the way of life in the capitalistic society of our country. Capital, manpower, and money are ingredients of one of the finest societies of our civilizations.

The College of Business and Economics prepares students to function and contribute to the expanding environment. You will learn to manage, using analytical skill and executive decisions. Whether you intend to operate a small firm or expect to join a corporate team, your program in business and economics will be meaningful.

A well rounded selection of liberal arts contributes to your personal development. Tool courses such as statistics and business English assist you with your upper-division course load and are also helpful in your career. Special fields of interest: economics, management, marketing, finance, and accounting, permit the student to specialize and concentrate in a particular area or career direction. Flexibility with electives allows the student to strengthen his program within special areas or provide other areas of proficiency.

The teaching methods in the College include lecture, labs, cases, guest lectures, field trips, and internship. Closed circuit video, telelecture, and other modern teaching technologies supplement class work. Student organizations and honoraries round out the student's experience in the College.

Job opportunities are available in large corporate organizations, small firms, and government.

Administrative Officers

Jack T. Turner, D.B.A. (Ind. U.), *Dean of the College of Business and Economics.*
Robert B. Conner, M.B.A. (WVU), *Director of Special Programs.*
Leo Fishman, Ph.D. (NYU), *Chairman of Department of Economics.*
Thomas S. Isaack, D.B.A. (Ind. U.), *Chairman of Department of Business.*
Patrick C. Mann, Ph.D. (Ind. U.), *Director of Graduate Programs in Economics.*
Joseph Newhouse, M.S. (WVU), *Director of Undergraduate Programs and Administrative Assistant to the Dean.*
James H. Thompson, Ph.D. (U. Pitt.), *Director of the Bureau of Business Research.*
Ben Tuchi, Ph.D. (St. Louis U.), *Director of Graduate Programs in Business and Industrial Relations.*

Faculty

Billy Bruce Atkins, J.D. (WVU), *Instructor in Business Law.*
Vance Q. Alvis, Ph.D. (U. Va.), *Professor of Economics.*
Lee S. Balliet, M.A. (Kent St. U.), *Assistant Professor of Economics.*
Lewis C. Bell, Ph.D. (U. Ky.), *Professor of Economics.*
Robert D. Britt, Ph.D. (U. Colo.), *Associate Professor of Economics.*
Jay Bucklew, M.B.A. (WVU), *Instructor in Management.*
Thomas C. Campbell, Jr., Ph.D. (U. Pitt.), *Professor of Economics.*
Jay Coats, M.B.A. (U. Pitt.), *Assistant Professor of Accounting.*
Robert B. Conner, M.B.A. (WVU), *Assistant Professor of Marketing.*
Robert Crawford, M.S. (VPI), *Instructor in Management.*
Chester Curry, M.B.A. (WVU), C.P.A., *Instructor in Accounting.*
Brent Dalrymple, Ph.D. (LSU), *Associate Professor of Finance.*

Edward K. Dix, Ph.D. (U. Md.), *Assistant Professor of Economics.*
George R. Dreese, Ph.D. (Ohio St. U.), *Associate Professor of Economics.*
Betty G. Fishman, M.A. (NYU), *Associate Professor of Economics and Finance.*
L. Edward Friend, J.D. (WVU), *Assistant Professor of Accounting and Business Law.*
John R. Goodwin, J.D. (WVU), *Associate Professor of Business Law.*
Waylon D. Griffin, Ph.D. (U. Tex.), *Assistant Professor of Marketing.*
Carter L. Grocott, M.B.A. (WVU), *Assistant Professor of Marketing.*
Robert Gwynne, M.B.A. (WVU), *Instructor in Accounting.*
Raymond M. Haas, D.B.A. (Ind. U.), *Professor of Marketing.*
John Harpell, Jr., M.B.A. (Ga. St. C.), *Assistant Professor of Management.*
Harvey Hegarty, Ph.D. (U. N.C.), *Assistant Professor of Management.*
Richard W. Humphreys, M.A. (U. Wisc.), *Assistant Professor of Economics.*
Thomas S. Isaack, D.B.A. (Ind. U.), *Professor of Management.*
Parviz Jenab, M.A. (Ind. U.), *Instructor in Economics.*
Jay E. Johnson, Jr., M.B.A. (NYU), C.P.A., *Associate Professor of Accounting.*
George E. Kirk, M.B.A. (WVU), *Assistant Professor of Management.*
Forest H. Kirkpatrick, LL.D. (Bethany C.), *Visiting Professor of Management.*
Stanley Kloc, M.B.A. (WVU), *Instructor in Management.*
Dennis R. Leyden, B.S. (Clemson U.), *Assistant Professor of Economics.*
Thomas Loehr, B.S. (WVU), *Instructor in Accounting.*
Wade McClure, M.B.A. (WVU), *Instructor in Management.*
Charles McKnew, Ph.D. (VPI), *Assistant Professor of Economics.*
William H. McMillion, M.S. (WVU), *Assistant Professor of Economics.*
Philip Mahin, M.B.A. (U. Penn.), *Assistant Professor of Marketing.*
Patrick C. Mann, Ph.D. (Ind. U.), *Associate Professor of Economics.*
George A. Markusic, J.D. (WVU), *Instructor in Business Law.*
Wendell G. Marston, M.A. (VPI), *Assistant Professor of Management.*
Robert S. Maust, M.S. (WVU), C.P.A., *Assistant Professor of Accounting.*
William H. Miernyk, Ph.D. (Harvard U.), *Professor of Economics.*
Austin Montgomery, Ph.D. (N. Tex. St. U.), *Associate Professor of Management.*
Adolph Neidermeyer, M.A. (Ohio St. U.), *Assistant Professor of Accounting.*
Joseph Newhouse, M.S. (WVU), *Associate Professor of Finance.*
Catherine Palomba, Ph.D. (Iowa St. U.), *Assistant Professor of Economics.*
Neil Palomba, Ph.D. (U. Minn.), *Associate Professor of Economics.*
Suzanne E. Reid, M.A. (Duke U.), *Assistant Professor of Economics.*
Evan O. Roberts, Ph.D. (U. Wisc.), *Professor Emeritus.*
James M. Rovelstad, Ph.D. (U. Mich.), *Associate Professor of Marketing.*
Kenneth L. Shellhammer, Ph.D. (U. Colo.), *Assistant Professor of Economics.*
Charles P. Skaggs, M.S. (WVU), C.P.A., *Assistant Professor of Accounting.*
Wil J. Smith, M.S. (U. Wisc.), *Assistant Professor of Economics.*
Randolph Stenger, M.B.A. (WVU), *Instructor in Marketing.*
Ward Stone, J.D. (WVU), *Instructor in Business Law.*
Larry Sweeney, B.S. (Marietta C.), *Program Coordinator.*
Owen A. Tapper, Ph.D. (U. Wisc.), *Assistant Professor of Economics.*
James H. Thompson, Ph.D. (U. Pitt.), *Professor of Economics.*
Ben Tuchi, Ph.D. (St. Louis U.), *Associate Professor of Finance.*
Jack T. Turner, D.B.A. (Ind. U.), *Professor of Marketing.*
John Warner, M.A. (Ind. U.), *Lecturer in Economics.*
Royce J. Watts, M.S. (WVU), *Assistant Professor of Economics.*
Louis A. Werbaneth, M.B.A. (U. Pitt.), C.P.A., *Special Lecturer in Accounting.*
Thomas S. Witt, M.A. (Wash. U.), *Assistant Professor of Economics.*
Fred E. Wright, Jr., A.M. (WVU), *Professor of Finance.*
Gregory Yi, Ph.D. (SUNY, Buffalo), *Associate Professor of Economics.*
Fred A. Zeller, Ph.D. (Ohio St. U.), *Associate Professor of Economics.*

Bureau of Business Research

An integral part of the College of Business and Economics, the Bureau of Business Research undertakes research into business and economics problems—particularly those of West Virginia. This research program is carried out by faculty members and others under the general supervision of the Director of the Bureau of Business Research. Publication of a series of monographs, the *West Virginia Business and Economic Studies*, was begun by the Bureau in 1949. *The Journal of Small Business Management*, a nationally circulated quarterly, also is published by the Bureau.

Accreditation

The College of Business and Economics is accredited not only through the approval of WVU by national and regional accrediting agencies, but also through full membership in the American Association of Collegiate Schools of Business. This association is the only accrediting agency in the field of professional education for business at the collegiate level.

Student Organizations

Beta Gamma Sigma, national scholarship society in commerce and business administration, is represented in the College of Business and Economics by the Alpha of West Virginia Chapter. Eligibility for membership is restricted to the highest 4 per cent of the junior class, the highest 10 per cent of the senior class, and the highest 20 per cent of the graduate students.

Student societies in specialized fields of business include *Beta Alpha Psi*, national professional accounting fraternity, and *Omicron Delta Epsilon*, national economics fraternity.

Second Bachelor's Degree

A student who has received a bachelor's degree from an approved college or university may become eligible for a second bachelor's degree in business administration or economics by earning a minimum of 30 semester hours of credits in residence in such course as the Dean may prescribe.

Work Taken at Other Institutions

Students who expect to obtain a degree from the College of Business and Economics and who wish to take work at other institutions must have their programs approved by the Dean of the College of Business and Economics before registering at another institution of higher learning. Ordinarily required courses must be taken at WVU.

REQUIREMENTS FOR DEGREES

Bachelor's Degree

To qualify for either the Bachelor of Science in Business Administration or Bachelor of Science in Economics degrees, the student must have:

1. Earned 128 semester hours of credit with a 2.0 (C) grade-point average on all work attempted at WVU. In addition, all students entering the

College of Business and Economics are required to maintain at least a 2.0 average on work attempted after their admission to the College.

2. Earned 128 semester hours of credit in subjects other than in Mathematics 2. A maximum of 6 hours of credit in Advanced Military Science (ROTC) or Air Force Aerospace Studies (ROTC) will be allowed toward graduation and is counted as a non-Business and Economics elective. Students who elect a foreign language must complete at least 6 hours in the same language.

3. Earned at least 60 hours of credit in upper-division (those numbered 100 or higher). Within the 60 hours, aside from required and elective courses in the College, majors in economics must complete 18 upper-division hours outside the College and business majors must have 9 upper-division hours outside the College.

4. Earned at least 30 hours of credit while enrolled in this College and in residence.

5. Satisfied the requirements of WVU Core Curriculum.

6. Satisfied the course requirements of one of the Business and Economics curricula described below.

Undergraduate Curricula

The College of Business and Economics offers two degrees—Bachelor of Science in Business Administration and Bachelor of Science in Economics. Programs leading to these degrees are designed to enable students to obtain a balanced selection of courses in liberal arts, a broad base of study in business and economics, and concentrated work in major areas of interest.

	B.S. in Business Administration	B.S. in Economics
Non-Business and Economics	*Hr.*	*Hr.*
English 1 and 2—Composition & Rhet.	6	6
Core Group A Courses		
English 8—Intermediate Composition	3	—
Speech Com. 11—Oral Communication	3	3
Other Group A electives	6	9
Core Group B Courses		
Pol. Sci. 2—American Fed. System	3	3
Psych. 1—Intro. to Psychology	3	3
Soc. 1—Intro. to Sociology	3	3
Other Group B electives (non-econ.)	6	6
Core Group C Courses		
Math. 3—College Algebra	3	3
Math. 8—Finite Math.	3	3
Other Group C electives	6	6
Physical Education—General Program	2	2
Other Electives—Non-bus. and econ.	18	21
Total Non-Business and Economics	65	68
Unrestricted Electives	3	6

B.S. in Business Administration

Required College Core Courses	*Hr.*
Acctg. 51 and 52—Principles	6
Econ. 51 and 52—Principles	6
Econ. 125—Statistics	3
Econ. 130—Money and Banking	3
Econ. 160—Labor Economics	3
Bus. Law 111—Legal Environment	3
Finan. 111—Business Finance	3
Mgmt. 111—Manufacturing	3
Mkt. 111—Marketing	3
	33
Accounting Majors	
Acctg. 111 and 112—Intermediate Accounting	6
Acctg. 113—Advanced Accounting	3
Acctg. 115—Cost Accounting	3
Acctg. 211—Accounting Systems or Acctg. 217—Auditing Theory	3
Bus. Law 112—Commercial Law	3
Electives—Business and Economics	9
	27
Business Management Majors	
Acctg. 115—Cost Accounting	3
Mgmt. 112—Production Planning and Control	3
Mgmt. 216—Personnel Management	3
Mgmt. 225—Business Policy	3
Electives—Business and Economics	15
	27
Finance Majors	
Econ. 241—Public Finance	3
Finan. 112—Financial Management	3
Finan. 150—Investments	3
Mgmt. 225—Business Policy	3
Electives—Business and Economics	15
	27
Marketing Majors	
Mkt. 112—Marketing Management	3
Mkt. 120—Advertising	3
Mkt. 215—Marketing Research	3
Mgmt. 225—Business Policy	3
Electives—Business and Economics	15
	27

B.S. in Economics

Required College Core Courses

Acctg. 51 and 52—Principles	6
Econ. 51 and 52—Principles	6
Econ. 125—Statistics	3
Econ. 211—Micro Econ. Analysis	3
Econ. 212—Macro Econ. Analysis	3
Econ. 216—History of Econ. Thought	3
	24

College Electives[1]

Econ.	15
Bus.	9
Econ. or Bus.	6

Distribution: At least one course (three credit hours) from three of the four areas of concentration.

Concentration: At least three courses (nine credit hours) in one area of concentration.

Areas of Concentration

Quantitative Analysis[2]

Econ. 220—Introduction to Quan. Analysis
Econ. 226—Advanced Statistics
Econ. 200—Special Topics[3]

Public Sector and Private Enterprise

Econ. 130—Money and Banking
Econ. 241—Public Finance
Econ. 245—Government and Business
Econ. 246—Transportation
Econ. 200—Special Topics[3]

Human Resources

Econ. 160—Labor Economics
Econ. 261—Trade Unions
Econ. 262—Collective Bargaining
Econ. 263—Economics of Wages
Econ. 265—Economics of Social Security
Econ. 200—Special Topics[3]

Regional, International and Development

Econ. 210—Comparative Economic Systems
Econ. 213—Economics Development
Econ. 250—International Economics
Econ. 255—Regional Economics
Econ. 270—Strategic Factors in American Economic Growth
Econ. 200—Special Topics[3]

[1]The changes will be effective for all students seeking a B.S. in Economics degree who entered the College of Business and Economics in or after the First Semester, 1973-74. Students who entered the College prior to August, 1973, may elect to follow the previous *Catalog* program or the new *Catalog* program.

[2]Students wishing to concentrate in quantitative analysis may supplement the areas with courses approved by his adviser in mathematics and/or statistics. Students must still take a minimum 15 hr. of electives in economics.

[3]The Special Topics course must be selected from the relevant area of concentration. Does not preclude students from taking additional courses (max. of 9 hr.) in the several 200 series of Special Topics courses.

PRE-BUSINESS AND ECONOMICS PROGRAM

Pre-Business and Economics students are expected to complete the program within their first two years of residence at the University. Pre-Business and Economics students will be transferred automatically to the College of Business and Economics when they have completed 58 credit hours.

Students must observe WVU Core Curriculum requirements as to distribution of elective courses. During the four years, the student must complete 12 hours of Group A electives including required Group A courses (Speech Com. 11 and English 8), 15 hours of Group B electives other than economics but including required Group B courses (Psych. 1, Sociol. 1, and Pol. Sci. 2), and 12 hours of Group C electives including the required Group C courses (Math. 3 and Math. 28) from the list of approved elective courses.

Business and Economics students beginning in August 1969, or after, must have completed or be taking Economics 125 (Statistics) before any other 100-level course in the Business and Economics "core" can be taken. In addition, such students are restricted to the 100-level Business and Economics "core" courses and certain specified exceptions until Economics 125 is completed successfully.

Freshman Year				Sophomore Year			
*First Sem.**	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3	Acctg. 51	3	Acctg. 52	3
Econ. 51	3	Econ. 52	3	Math. 28[2]	3	Econ. 125	3
Pol. Sci. 2	3	Math. 3	3	Speech Com. 11	3	Core A	3
Psych. 1	3	Sociol. 1	3	Core A	3	Core B	3
Phys. Ed.[1]	1	Phys. Ed.	1	Core B	3	English 8	3
Core C	3	Core C	3				
	16		16		15		15

*The student deficient in mathematics, as evidenced by the ACT score, must take Math. 2, the remedial algebra course, during the first semester of residence in order to prepare for Math. 3 and 8 required in subsequent semesters.

B.S. IN BUSINESS ADMINISTRATION PROGRAMS

Accounting[1]

Junior Year				Senior Year			
First Sem.[2]	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Acctg. 111	3	Acctg. 112	3	Acctg. 211 (or		Acctg. 113	3
Acctg. 115	3	Bus. Law 112	3	Acctg. 217–		Econ. 160	3
Bus. Law 111	3	Mgmt. 111	3	2nd Sem.)	3	Electives–	
Finance 111	3	Mkt. 111	3	Econ. 130	3	Bus. or Econ.	3
Electives–		Electives–		Electives–		Electives–	
Outside	6	Outside	6	Bus. or Econ.	6	Outside	3
				Electives–		Electives	
				Outside	3	Unrestricted	3
	18		18		15		15

Business Management[1]

Junior Year				Senior Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Bus. Law 111	3	Acctg. 115	3	Econ. 160	3	Econ. 130	3
Mgmt. 111	3	Finance 111	3	Mgmt. 216	6	Mgmt. 225	3
Mkt. 111	3	Mgmt. 112	3	Electives—		Electives—	
Electives—		Electives—		Bus. or Econ.	6	Bus. or Econ.	3
Bus. or Econ.	6	Outside	6	Electives—		Electives—	
Electives—		Electives—		Outside	3	Outside	3
Outside	3	Bus. or Econ.	3			Electives—	
						Unrestricted	3
	18		18		15		15

Finance[1]

Junior Year				Senior Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Bus. Law 111	3	Finance 112	3	Econ. 241	3	Econ. 160	3
Econ. 130	3	Mgmt. 111	3	Finance 150	3	Mgmt. 225	3
Finance 111	3	Mkt. 111	3	Electives—		Electives—	
Electives—		Electives—		Bus. or Econ.	6	Bus. or Econ.	3
Bus. or Econ.	3	Outside	6	Electives—		Electives—	
Electives—		Electives—		Outside	3	Outside	3
Outside	6	Bus. or Econ.	3			Electives—	
						Unrestricted	3
	18		18		15		15

Marketing[1]

Junior Year				Senior Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Bus. Law 111	3	Econ. 130	3	Econ. 160	3	Mkt. 215	3
Mgmt. 111	3	French 111	3	Mkt. 120	3	Mgmt. 225	3
Mkt. 111	3	Mkt. 112	3	Electives—		Electives—	
Electives—		Electives—		Bus. or Econ.	6	Bus. or Econ.	3
Bus. or Econ.	3	Outside	6	Electives—		Electives—	
Electives—		Electives—		Outside	3	Outside	3
Outside	3	Bus. or Econ.	3			Electives—	
						Unrestricted	3
	15		18		15		15

[1]A minimum of 128 hours of credit must be earned in subjects other than Math. 2. A maximum of 30 credit hours in Accounting is permitted in the 128-hour requirement.

[2]The student deficient in mathematics, as evidenced by the ACT score, must take Math. 2, the remedial algebra course, during the first semester in residence in order to prepare for Math. 3 and 8 required in subsequent semesters.

B.S. IN ECONOMICS PROGRAM*

The economics program is designed for those who wish to emphasize economics in their education for a business career, for those who wish to undertake graduate work for an advanced degree in this field, and for those who wish to enter government service.

Junior Year				Senior Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Econ. 211	3	Econ. 212	3	Electives—Bus.	3	Econ. 216	3
Electives—Bus.	3	Electives—Bus.	3	Electives—Econ.	6	Electives—Bus. or Econ.	3
Electives—Econ.	3	Electives—Econ.	6	Electives—Bus. or Econ.	3	Electives—Outside	3
Electives—Outside	9	Electives—Outside	6	Electives—Outside	3	Electives—Unrestricted	6
	18		18		15		15

*The student must earn at least 60 hours in upper-division courses (numbered 100 or higher). The apparent excess requirement of 6 hours (total of 66 hours indicated under each program) provides for the completion of the University Core program which may be at the lower-division (courses numbered 1 to 99) or upper-division levels. However, the student must take a minimum of 9 hours of upper-division non-commerce electives in the various Business programs and 18 hours in the Economics program.

Courses of Instruction

Accounting*

Acctg.

51. **Principles of Accounting.** I, II. 3 hr. PR: Sophomore standing. The fundamentals of accounting for business enterprises: the accounting cycle, journals and ledgers, working papers, statements.

52. **Principles of Accounting.** I, II. 3 hr. PR: Acctg. 51. Further study of the accounting process with emphasis on assets, liabilities, and net worth; manufacturing accounts; analysis of financial statements.

111. **Intermediate Accounting.** I. 3 hr. PR: Acctg. 52. Analysis of accounting theory and practice as applied to business firms; assets valuation, liabilities, income determination.

112. **Intermediate Accounting.** II. 3 hr. PR: Acctg. 111. A continuation of Acctg. 111.

113. **Advanced Accounting.** II. 3 hr. PR: Acctg. 112. Accounting for partnerships, consolidations, installment sales, consignments, receiverships, reorganizations, branches, foreign exchanges, and estates and trusts.

115. **Cost Accounting.** I, II. 3 hr. PR: Acctg. 52. Fundamentals of cost determination with emphasis on the significance of cost data and their interpretation; process, job-order, and standard costs.

*Economics 52 is a prerequisite for all upper-division courses.

200. **Special Topics.** I, II, S. 1-4 hr. PR: Acctg. 112 or consent. Study of special topics relevant to accounting. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward the bachelor's and master's degrees.

211. **Accounting Systems.** I. 3 hr. PR: Acctg. 112. The adaptation of accounting procedures to the demands of the firm, with emphasis on theoretical factors important to efficiency and internal control; systems surveys and reports, the design of forms, office machine applications.

213. **Income Tax Accounting.** I. 3 hr. PR: Acctg. 112 or consent. Tax theory and practice as developed from the regulations of the Internal Revenue Service; problems in preparation of tax returns for individuals, partnerships, and corporations.

214. **Income Tax Accounting.** II. 3 hr. PR: Acctg. 213. A continuation of Acctg. 213.

216. **Advanced Cost Accounting.** II. 3 hr. PR: Acctg. 115. Advanced work in the application of cost theory and procedures to cases and problems which emphasize the managerial use of cost information.

217. **Auditing Theory.** I or II. 3 hr. PR: Acctg. 112. Auditing fundamentals; objectives, standards and procedures; introduction to working-paper techniques; procedure statements of the American Institute of CPA's.

218. **Auditing Practice.** I or II. 3 hr. PR: Acctg. 217. Application of auditing theory and procedures, with emphasis on decisions which invoke judgment and are important in independent audits; audit working papers and reports; case studies.

224. **Advanced Accounting Problems.** I or II. 3 hr. PR: Minimum of 18 hours in accounting with an average grade of B or higher. Analysis and solution of representative CPA problems.

230. **Advanced Accounting Theory.** I or II. 3 hr. PR: Acctg. 112, 115, and consent. A critical analysis of accounting concepts and standards with emphasis on their origin, development, and significance.

Business Law*

Bus. Law

111. **Legal Environment of Business.** I, II. 3 hr. The nature of law and the judicial system. The relationship of law, ethics, and cultural values to business enterprise. Substantive law of contracts, sales, and credit transactions and the social and economic consequences of court decisions.

112. **Commercial Law.** I, II. 3 hr. PR: Bus. Law 111. Substantive law of agency, partnerships, corporations, negotiable instruments, and property and their social and economic functions.

200. **Special Topics.** I, II, S. 1-4 hr. PR: Bus. Law 112 or consent. Study of special topics relevant to business law. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward the bachelor's and master's degrees.

*Economics 52 is a prerequisite for all upper-division courses.

Economics*

Econ.

51. **Principles of Economics.** I, II. 3 hr. Principles of resource allocation, income, output and price determination under different competitive conditions; money, banking, and monetary policy; national income, employment, and fiscal policy; taxation and government spending; international economics, underdeveloped areas, and comparative economic systems.

52. **Principles of Economics.** I, II. 3 hr. PR: Econ. 51. Continuation of Econ. 51.

125. **Statistics.** I, II. 3 hr. PR: Math. 3, 8. Basic statistical methods employed in collection, presentation, analysis, and interpretation of business and economic data such as analysis of frequency distributions, probability distributions, statistical inference, regression and correlation, time series, and index numbers.

130. **Money and Banking.** I, II. 3 hr. Our system of monetary and banking arrangements, viewed in relation to functioning of the economic system as a whole.

160. **Labor Economics.** I, II. 3 hr. An introduction to labor economics and labor relations in industry, including the interaction to economic forces, union policies, personnel practices, and labor law.

200. **Special Topics.** I, II, S. 1-4 hr. PR: Econ. 51 and 52 or consent. Study of special topics relevant to economics. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward the bachelor's and master's degrees.

205. **Current Economic Problems.** S. 3 hr. For students in education only. A course designed to acquaint public school teachers with reliable source material in economics and to instruct them in studying current economic problems.

210. **Comparative Economic Systems.** I or II. 3 hr. Structure and processes of existing economic systems throughout the world including review of basic principles of free enterprise, socialistic, communistic, and fascistic societies. Comprehensive analysis based on current and recent experiments in these economies.

211. **Micro Economic Analysis.** I or II. 3 hr. A study of price and output determination and resource allocation in the firm under various competitive conditions.

212. **Macro Economic Analysis.** I or II. 3 hr. An analysis of the forces which determine the level of income, employment, and output. Particular attention is given to consumer behavior, investment determination, and government fiscal policy.

213. **Economic Development.** I or II. 3 hr. A comprehensive study of the problems, changes, and principal policy issues faced by non-industrialized countries in the process of economic development.

216. **History of Economic Thought.** I or II. 3 hr. Economic ideas in perspective of historic development.

*Economics 52 is a prerequisite for all upper-division courses.

220. **Introduction to Quantitative Analysis.** I or II. 3 hr. PR: Econ. 125. Study of the principal mathematical techniques employed in economic analysis; an introduction to econometrics.

226. **Advanced Statistics.** II. 3 hr. PR: Econ. 125 or equiv. An advanced approach to statistical analysis with emphasis on probability, inference, and multivaried statistical techniques.

241. **Public Finance.** I, II. 3 hr. Governmental fiscal organizations and policy; taxes and tax systems with particular emphasis upon the federal government and the state of West Virginia.

245. **Government and Business.** I or II. 3 hr. Government in its role of adviser and umpire; analysis of governmental policies and practices affecting business.

246. **Transportation.** I, II. 3 hr. Development of an inland transportation system and relations and policies of transport agencies.

250. **International Economics.** I or II. 3 hr. Development of trade among nations; theories of trade, policies, physical factors, trends, and barriers in international economics.

255. **Regional Economics.** I or II. 3 hr. Analysis of factors that promote or deter the economic growth of a region, with emphasis on such matters as population shifts, economic base studies, industrial location analyses, input-output techniques, regional income estimation, local multiplier and cycle concepts, and the role of government in regional growth.

261. **Trade Unionism.** I or II. 3 hr. PR: Econ. 160 or consent. Analysis of the structure, government, attitudes, and policies of organized labor; the implications of union policy.

262. **Collective Bargaining.** I or II. 3 hr. PR: Econ. 160 or consent. Theory and practice of collective bargaining; including contract issues, types of relationships, and the role of government policy.

263. **Economics of Wages.** I or II. 3 hr. PR: Econ. 160 or consent. Determination of wage levels and structure; the functioning and organization of labor markets.

265. **Economics of Social Security.** I or II. 3 hr. PR: Econ. 51 and 52 or consent. An examination and analysis of our social and political efforts to provide economic security, including an examination of the parallel developments of private insurance.

270. **Growth of the American Economy.** I, II. 3 hr. Central issues in the development of the American economy.

299. **Readings in Economics.** I, II, S. 1-3 hr. PR: Econ. 211, 212 and consent. Students will develop and carry out a program of specialized readings under the supervision of a cooperating instructor.

Finance*

Finan.

111. **Business Finance.** I, II. 3 hr. PR: Acctg. 51 and 52. A study of the activities of the finance manager in the planning, acquisition, and administration of funds used in a business enterprise.

112. **Financial Management.** II. 3 hr. PR: Finan. 111. Application of fundamentals and theory to the analysis of cases in business finance.

115. **General Insurance.** I, II. 3 hr. Theory of risk and its application to insurance; principles underlying all forms of insurance—life, property, casualty, fire, and surety.

120. **Life Insurance.** I. 2 hr. PR: Finan. 115. Principles of life-insurance protection; legal regulation of insurance companies.

150. **Investments.** I. 3 hr. PR: Finan. 111 or consent. Investment analysis and management for the individual and the financial institution.

161. **Real Estate.** II. 3 hr. Principles and practices of real estate business.

200. **Special Topics.** I, II, S. 1-4 hr. PR: Finan. 111 or consent. Study of special topics relevant to finance. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward the bachelor's and master's degrees.

216. **Risk Management.** II. 3 hr. PR: Finan. 115 or consent. A study of the transferable risks with which the enterpreneur must deal. Emphasis is on the process by which decisions are made for the handling of these risks, including an examination of the contributions and limitations of the insurance system.

Management*

Mgmt.

105. **Management Process.** I, II. 3 hr. A study of management as a process comprised of the functions of planning, organizing, directing, and controlling business activities. Emphasis is placed on management as a rational, orderly, intellectual process for making resources productive.

111. **Manufacturing.** I, II. 3 hr. A survey of the important activities of the manufacturing function including organization, economic limitations affecting manufacturing, and control systems and analytical tools used by manufacturing managers.

112. **Production Planning and Control.** II. 3 hr. PR: Mgmt. 111. The management of manufacturing and production activities with emphasis on their coordination and control to achieve production goals.

200. **Special Topics.** I, II, S. 1-4 hr. PR: Mgmt. 111 or consent. Study of special topics relevant to management. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward the bachelor's and master's degree.

*Economics 52 is a prerequisite for all upper-division courses.

213. **Problems in Business Administration.** I, II, S. 1-3 hr. Selected management problems related to the total enterprise and the emerging technostructure, e.g., managerial and corporate strategy, utilization of resources, social responsibility and government relations, dynamics of the new industries.

216. **Personnel Management.** I, II. 3 hr. Principles and practices in the direction, coordination, and remuneration of manpower.

Marketing*

Mkt.

111. **Marketing.** I, II. 3 hr. Analysis of those activities through which business firms direct the flow of their goods and services to consumers and users.

112. **Marketing Management.** II. 3 hr. PR: Mkt. 111. The application of fundamentals and theory to the analysis of marketing cases and the development of marketing strategies.

115. **Distribution Channels.** I, II. 3 hr. PR: Mkt. 111. Management of channel systems with emphasis on retail distribution, channel choice, strategies, control, and optimization within the context of role, power, conflict and communications.

120. **Advertising.** I, II. 3 hr. PR: Mkt. 111 and 112. Introduction to principles and practices of advertising, including preparation of a complete advertising campaign.

200. **Special Topics.** I, II, S. 1-4 hr. PR: Mkt. 111 or consent. Study of special topics relevant to marketing. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward the bachelor's and master's degrees.

210. **Industrial Purchasing.** I. 3 hr. PR: Mkt. 111. A survey of corporate procurement problems facing modern purchasing executives.

215. **Marketing Research.** II. 3 hr. PR: Mkt. 111. The utilization of marketing research techniques in the solution of practical marketing problems.

225. **Business Policy.** I, II. 3 hr. PR: Senior standing and consent. Integrated study of policies, organization, facilities, and control techniques of business enterprises.

*Economics 52 is a prerequisite for all upper-division courses.

Creative Arts Center

West Virginia University's Creative Arts Center is occupied by the three divisions—Music, Art, and Drama. The Center has attracted national attention as demonstrated by the number of individuals who come to see and enjoy it. The instructional programs and cultural activities have added a new dimension to the University and the community. Student and faculty performances, shows from Broadway, and artists of national and international fame are presented in the Creative Arts Center. Almost all WVU students, at some time or other, are enrolled in a music, art, or drama class or have attended performances or exhibits in this new cultural facility. The second phase of the Center, completed in 1973, accommodates the expanding instructional needs of the three divisions.

The high school student who is seriously interested in the arts, who believes his abilities are superior and who wants to prepare himself for a professional career in the arts should plan to visit the Creative Arts Center to meet students and faculty, visit classes, attend performances, view exhibits, and see the fine facilities and modern equipment. The Division of Music offers a four-year curriculum in Piano, Voice, Organ, and every band and orchestral instrument except Harp; Theory-Composition, Theory-Music History, and Music Education-Vocal Emphasis and Music Education-Instrumental Emphasis. The Division of Art offers a four-year curriculum in Studio Arts and in Art Education. The Division of Drama offers a four-year curriculum in Applied Drama with an option in Acting-Directing or Design and Technical Theatre, Acting-Voice, and General Theatre.

Since most high schools offer a college preparatory program that emphasizes the academic subjects such as science, mathematics, history, etc., the student who is planning to major in the arts in college will usually have one-half or more of his freshman year subjects in music, art, or drama. For most students, this will be the first time they are studying the subjects they like best and for which they receive appropriate credit-hours. It is not unusual for the student's weekly schedule to provide one or two full half-days that he can use for laboratory work, practice, library reading, or other individual projects. The hours between classes can be used as the student decides. With all types of interesting activities, books, exhibits, lectures, student meetings, cultural programs, athletic and social events, the student is constantly making decisions concerning the wise use of his time. For the arts major, it is his responsibility to keep his academic interests in good balance with his cultural concentration. For the other WVU students, it is their responsibility to keep cultural interests in good balance with their academic concentration.

The Creative Arts Center provides professional preparation of the highest quality under the guidance and direction of outstanding artists, performers, and educators. The alumni represent the strongest evidence of success as they establish their reputations in teaching, performance, and technical careers in many states and foreign countries. With one of the finest buildings for the arts in the nation, with an outstanding faculty, and with an aggressive and innovative attitude, the Creative Arts Center is establishing a national reputation in the arts.

A number of Saturdays are scheduled throughout the school year for student conferences and auditions. For information or appointment, write or call the Assistant Dean, Creative Arts Center, West Virginia University, Morgantown, W. Va. 26506; telephone (304) 293-4642.

Faculty

Richard E. Duncan, Ph.D. (U. Rochester), *Dean and Director of Creative Arts Center; Professor of Music.*
Clifford W. Brown, M.F.A. (Carnegie Tech), *Assistant Dean of Creative Arts Center; Professor of Music.*

Division of Music

Jon E. Engberg, D.M.A. (U. Rochester), *Associate Professor and Chairman of Music. Violoncelli, Chamber Music.*
James W. Benner, M.A. (Columbia U.), *Assistant Professor of Music. Vocal Diction, Repertoire; Opera Theatre; Piano.*
Thomas S. Brown, Ph.D. (Northwestern U.), *Assistant Professor of Music. Music Education.*
David L. Busch, D.M.A. (LSU), *Instructor in Music. Oboe, Chamber Music, Theory.*
Thomas S. Canning, M.M. (U. Rochester), *Professor of Music. Composition, Theory.*
Walter L. Coplin, M.M. (WVU), *Assistant Professor of Music. String Bass, Instrument Classes, Music Education.*
Jon Crain, *Professor of Music. Voice.*
Rose Crain, *Assistant Professor of Music. Voice.*
Harry Elzinga, Ph.D. (Ind. U.), *Assistant Professor of Music. Musicology, Theory, Collegium Musicum.*
Clyde N. English, D.S.M. (Union Theol. Sem.), *Associate Professor of Music. Organ.*
Philip J. Faini, M.M. (WVU), *Associate Professor of Music. Percussion, African Music.*
Mary Jane Glasscock, M.M. (WVU), *Instructor in Education. Music Education.*
Herman Godes, M.M. (Latvian St. Mus. Acad.), *Professor of Music. Piano.*
Joseph A. Golz, M.A. (Columbia U.), *Professor of Music. Director, Opera Theatre; Conducting; Choral Music.*
Leo Horacek, Ph.D. (U. Kans.), *Professor of Music; Chairman, Department of Music Education. Music Education.*
Barton Hudson, Ph.D. (Ind. U.), *Associate Professor of Music. Musicology.*
Charles L. Krusenstjerna, D.M.A. (U. Rochester), *Associate Professor of Music. Clarinet, Saxophone.*
Mary Krusenstjerna, M.M. (U. Rochester), *Assistant Professor of Music (part time). Flute.*
Gerald Lefkoff, Ph.D. (Catholic U. of America), *Professor of Music. Theory, Electronic Music. Viola.*
Frank E. Lorince, Jr., Ph.D. (U. Rochester), *Professor of Music; Chairman, Department of Theory and Composition.*
Margaret S. Lorince, M.M. (U. Rochester), *Associate Professor of Music (part-time); Chairman, Preparatory Department. Piano.*
Bernard R. McGregor, M.F.A. (Carnegie Tech), *Associate Professor of Music. Voice.*
James E. Miltenberger, D.M.A. (U. Rochester), *Associate Professor of Music. Piano, Piano Repertoire.*
William R. Nelson, M.M. (Duquesne U.), *Instructor in Music. Piano.*
Jane R. Pestun, M.M. (WVU), *Instructor in Music. Piano.*
Donald C. Portnoy, D.M.A. (Peabody Cons. Mus.), *Associate Professor of Music; Chairman, Department of Applied Music. Violin; Conductor, University Symphony Orchestra; Conducting.*
Richard E. Powell, M.E. (S.W. Tex. St. C.), *Assistant Professor of Music. Brass Instruments.*

George E. Schafer, Ph.D. (U. Rochester), *Professor of Music; Chairman, Graduate Studies. Musicology.*
Stephanie Shehatovich, *Instructor in Music—University Extension. Piano.*
Roger C. Sherman, M.M. (U. Rochester), *Associate Professor of Music. Trumpet.*
Edward Sprague, M.S. (Syracuse U.), *Associate Professor of Music—University Extension.*
Forrest W. Standley, *Instructor in Music. French Horn.*
Mary E. Stringham, M.A. (WVU), *Assistant Professor of Music. Music Education.*
R. Scott Stringham, Ph.D. (Cornell U.), *Associate Professor of Music. Choir, Musicology, Music Appreciation.*
June D. Swartwout, M.M. (WVU), *Assistant Professor of Music (part-time). Voice.*
Don G. Wilcox, M.A. (Cal. St. C., Long Beach), *Assistant Professor of Music. Director of Bands, Theory, Conducting.*
William O. Winstead, M.M. (WVU), *Associate Professor of Music. Bassoon, Theory.*
Frances Yeend, *Professor of Music. Voice.*

Division of Art

Urban Couch, M.F.A. (Cranbrook Acad. Art), *Professor and Chairman of Art.*
Peter E. Charles, M.F.A. (Yale U.), *Assistant Professor of Art.*
John D. Clarkson, M.A. (U. Pitt.), *Professor of Art and Curator and Director of Acquisitions.*
Barbara A. Drainer, Ed.D. (Columbia U.), *Associate Professor of Art.*
Ben Freedman, M.A. (U. Ariz.), *Associate Professor of Art.*
Wendell E. McPherson, *Instructor (part-time) in Art.*
Michael G. Miketta, M.F.A. (Yale U.), *Instructor in Art.*
Charles E. Patton, A.M. (West. Res. U.), *Professor Emeritus.*
Will Petersen, M.F.A. (Calif. C. Arts and Crafts), *Associate Professor of Art.*
Margaret T. Rajam, M.A. (U. Mich.), *Associate Professor of Art.*
Stanley E. Shafer, M.F.A. (U. Colo.), *Assistant Professor of Art.*
William J. Thomas, M.A. (Philadelphia C. Art), *Assistant Professor of Art.*

Division of Drama

William R. McGraw, Ph.D. (U. Minn.), *Professor and Chairman of Drama.*
Sam Boyd, Jr., M.F.A. (Carnegie Tech), *Professor of Drama.*
Robert B. Burrows, Ph.D. (Ohio St. U.), *Professor Emeritus.*
Joe E. Ford, M.A. (WVU), *Associate Professor of Drama; Director of West Virginia High School Drama Festival.*
Mary Kathryn Funderburk, M.A. (WVU), *Instructor in Drama; Oral Interpretation.*
Albert Lipton, *Assistant Professor of Drama.*
John C. McIlwee, M.A. (WVU), *Instructor in Drama.*
Craig Martin, M.F.A. (Yale U.), *Assistant Professor of Drama.*
Adel A. Migid, M.F.A. (Ohio U.), *Instructor in Drama.*
Patrick B. Murphy, M.A. (U. Wash.), *Assistant Professor of Drama.*
Charles D. Neel, Ph.D. (Cornell U.), *Associate Professor of Drama; Studio Theatre Supervisor.*
Frederick F. Ulrich, III, M.F.A. (Yale U.), *Assistant Professor of Drama.*

Division of Music

The student interested in a career in music has a wide range of occupations from which to choose. Most fall into one of three basic categories: performing, composing or arranging, and teaching. All of the curriculums leading to the Bachelor of Music degree prepare the student to teach his own principal instrument (or voice) in the private music studio. Students who complete one of the curriculums in Music Education will have satisfied course requirements to teach either vocal or instrumental music and general music in elementary and secondary schools, grades 1-12. With further study

on the graduate level, students may qualify for teaching positions in a junior or community college, four-year college, or university. Others may enter a career in performance as a solo artist or as a member of an ensemble, or may compose or arrange music for performance.

In addition to these rather specialized opportunities, music graduates are qualified to seek positions in industry as consultants with book companies, editors, business managers, and executives. Musicians are sought by the music industry as consultants with manufacturers of musical instruments and supplies, and for positions in selling, in sales managing, and as business executives.

It is quite possible for a music major to move from one music curriculum to another, particularly during the freshman or sophomore year, without great loss of course credit. Music majors are encouraged to explore and to follow the curriculum for which they are best qualified and in which they can expect the greatest success. Evaluation of their work by the Division of Music faculty will aid these decisions.

The Division of Music is a member of the National Association of Schools of Music. The Music Education program offered in the Division is fully accredited by the National Council for Accreditation of Teacher Education. In addition to the undergraduate program, courses leading to the following graduate degrees are offered: Master of Music, Doctor of Philosophy, and Doctor of Musical Arts.

The 35-member faculty brings a rich background in professional performance and musical scholarship, along with a sincere interest in students, to its teaching. Students find these dedicated teachers to be both demanding and sympathetic.

Faculty performing groups in the Division are the Abbey Brass Guild, Woodwind Quintet, the String Trio, and the West Virginia Symphonette. Student performing groups are the Symphony Orchestra, three bands, three choral groups, the Percussion Ensemble, the Opera Theatre, the Trombone Ensemble, the Jazz Ensemble, the Collegium Musicum, and numerous other chamber music ensembles.

Class instruction at the beginning levels is provided for 1 hour credit in woodwind instruments (Music 44), brass instruments (Music 45), string instruments (Music 46), and percussion (Music 47). Class piano instruction (Music 110, Sections 30-49) and class voice instruction (Music 110, Sections 50-79) also are available.

Musical Organizations

After completing four semesters in one of the bands or the orchestra, especially qualified members of these organizations may continue service in them upon invitation and receive allowances in the form of remission of fees amounting to $30.00 per semester.

The *University-Community Symphony Orchestra* is open to all students, faculty members, and citizens of the community who are proficient in the playing of an orchestra instrument. The repertoire is that of the standard symphony orchestra, with special emphasis on contemporary American music. Full rehearsals are held each Wednesday evening at 7:30, with sectional rehearsals scheduled twice weekly in the late afternoon. May be taken with or without 1 hour credit as Music 103.

The *University Singers* is an ensemble of 60 vocalists selected by audition. The group sings the standard choral repertoire and makes several off-campus appearances during the year. Three rehearsals per week. May be taken with or without 1 hour credit as Music 105, sec. 02.

The *Camerata Singers* is a chamber ensemble of 10 singers selected by audition. The repertoire of the group ranges from the Middle Ages to contemporary music. Two rehearsals per week. May be taken with or without 1 hour credit as Music 115, sec. 6.

The *Collegium Musicum* is devoted to the performance of music for small vocal or instrumental ensembles, primarily early music. Two rehearsals per week. May be taken for 1 or 2 hours credit as Music 334.

The *University Choral Union* is open to all University students who can satisfactorily sing a part. This organization offers opportunity to participate in the performance of major choral works. Two rehearsals per week. May be taken with or without 1 hour credit as Music 102.

The *University Bands* are composed of three units: the Mountaineer Marching Band (active during the football season), the Concert Band, and the Wind Symphony. Membership is open to all qualified men and women in the University. May be taken with or without 1 hour credit as Music 100.

Student Organizations

The Division of Music sponsors Epsilon Nu chapter of *Mu Phi Epsilon,* Epsilon Sigma chapter of *Phi Mu Alpha,* Omicron chapter of *Kappa Kappa Psi,* and a chapter of the *Music Educators National Conference.*

Bachelor of Music Degree

Acceptance. Before being accepted as a music major, each student must demonstrate satisfactory previous musical preparation through an entrance audition. These conference-auditions are held in Morgantown throughout the school year. A tape recording and other supporting material may be submitted when circumstances prevent a visit to Morgantown for this purpose. Dates of these auditions and details concerning them are available from the Chairman of the Division of Music.

In addition to fulfilling the special requirements indicated below for the music curriculum of his choice, each candidate for the degree Bachelor of Music also must satisfy the following general requirements:

Grade Levels. Before graduation, each undergraduate student must satisfy specified minimum proficiency levels of performance (Grade Levels) on his major instrument (or voice) and piano (if piano is not his major instrument). A listing of the Grade Levels for each instrument is available from the Division of Music. The repertoire listed for each Level (or works of comparable technical and musical difficulty) is to be performed with musical understanding as well as technical accuracy to satisfy the requirement. Students who do not meet indicated Grade Levels must make up their deficiencies as soon as possible, and are subject to probation. When the faculty feels the deficiencies are so great and the student's musical talent so minimal that the possibility of fulfilling graduation requirements is impossible, the student will be notified that his enrollment in the Division of Music will be terminated.

Keyboard Proficiency Examination. In addition to fulfilling the Grade Level requirement in piano indicated in the curriculum, each student is required to demonstrate proficiency in keyboard harmony by passing a special examination.

Recital and Concert Attendance. Each full-time undergraduate music major must maintain a satisfactory record of attendance at recitals and concerts presented at WVU during each semester of residence.

Participation in Musical Organizations. Each music major must participate in musical organizations as indicated in his curriculum. Scholarship recipients may be called upon to render special service (as participants in particular organizations or ensembles, as piano accompanists, etc.) as designated by the Division Chairman.

Completion of Degree Requirements. The student is responsible for correctly fulfilling all graduation requirements. Each student should review his curriculum requirements both before and after every registration period so that errors or omissions will be detected immediately. *Transfer students* must establish transfer credit from other institutions as early as possible in their WVU study—hopefully during the first semester of residence. The Bachelor of Music degree is conferred upon any student who complies with the general regulations of the University concerning degrees, satisfies all entrance and departmental requirements, and completes one of the curriculums in music with a minimum overall grade-point average of 2.0 (C).

Applied Music Curriculums

The Applied Music curriculums are especially designed for students wishing to prepare themselves as performers or as teachers of a particular instrument or voice. The increased interest of society today in the arts is creating many new opportunities for the professional musician and for the private music teacher.

A student following an Applied Music curriculum should enter as a freshman having achieved Grade Level 6 on his major instrument, and must complete Grade Level 10 on that instrument to be eligible for graduation. In addition to presentation of a senior recital, Applied Music majors also must present three solo performances on the major instrument in student recitals.

Applied Music majors are encouraged to participate in the Division's major performing organizations (Music 100-105). However, not more than 8 hours of credit for performance in these organizations will be counted toward requirements for graduation.

APPLIED CURRICULUM—PIANO

At least 2 of the 8 credit hours to be earned through participation in musical organizations (Music 100-105) must be as a member of a choral group (Music 102 or 105). A total of 16 credit hours of courses from Core Groups B and C is required, with no less than 6 credit hours to be earned in either group. A recommended distribution of the courses required in this curriculum follows:

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 61, 62	4	Music 63, 64	4
Music 31	1	Music 32	1
Music 100-105	1	Music 100-105	1
English 1	3	English 2	3
Core B or C	3-4	Core B or C	3-4
Phys. Ed. 1	1	Phys. Ed. 2	1
	17-18		17-18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 65, 66	4	Music 67, 68	4
Music 33	2	Music 34	2
Music 100-105	1	Music 100-105	1
Music 115	1	Music 115	1
Music elective	2	Music elective	2
Elective	3	Elective	3
	17		17

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 265	3	Music 231, 232, 330-333	3
Music 100-105	1	Music 100-105	1
Music 115	1	Music 115	1
Music 118	1	Music 119	1
Music 263	2	Music 264	2
Music elective	2	Music elective	2
Core A	3	Core B or C	3
	17		17

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 115	1	Music 115	1
Music 218	2	Music 219	2
Non-music elective	3	Music 299	2
Music 100-105	1	Music 100-105	1
Core B or C	3-4	Core B or C	3-4
Music elective	2	Music elective	2
	16-17		15-16

APPLIED CURRICULUM—ORGAN

In addition to the required Grade Level 10 in organ, this curriculum also requires achievement of Grade Level 6 in piano before graduation. At least 6 of the 8 credit hours to be earned through participation in musical organizations (Music 100-105) must be as a member of a choral group (Music 102 or 105). A total of 16 credit hours from Core Groups B and C is required, with no less than 6 credit hours earned in either group. A recommended distribution of the courses required in this curriculum follows:

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 110	2	Music 110	2
Music 61, 62	4	Music 63, 64	4
Music 31	1	Music 32	1
Music 100-105	1	Music 100-105	1
English 1	3	English 2	3
Core B or C	3-4	Core B or C	3-4
Phys. Ed. 1	1	Phys. Ed. 2	1
	19-20		19-20

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 110	2	Music 110	2
Music 65, 66	4	Music 67, 68	4
Music 33	2	Music 34	2
Music 100-105	1	Music 100-105	1
Elective	3	Elective	3
	16		16

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 51	2	Music 231, 232,	
Music 265	3	330-333	3
Music 263	2	Music 264	2
Music 118	1	Music 119	1
Music 100-105	1	Music 100-105	1
Music elective	2	Music elective	2
Core A	3	Core B or C	3
	18		16

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 100-105	1	Music 100-105	1
Music 218	1	Music 219	1
Non-Music elect.	3	Music 299	2
Core B or C	3-4	Core B or C	3-4
Music elective	4	Music elective	4
	16-17		15-16

APPLIED CURRICULUM—BAND OR ORCHESTRA INSTRUMENT

Flute, Oboe, Clarinet, Saxophone, Bassoon, Horn, Trumpet, Trombone, Euphonium, Tuba, Percussion, Violin, Viola, 'Cello, and Double Bass

In addition to the required Grade Level 10 on the major instrument, this curriculum also requires achievement of Grade Level 3 in piano before graduation. A total of 16 credit hours of courses from Core Groups B and C is required, with no less than 6 credit hours earned in either group. A recommended distribution of the courses required in this curriculum follows:

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 110	2	Music 110	2
Music 61, 62	4	Music 63, 64	4
Music 31	1	Music 32	1
Music 100 or 103	1	Music 100 or 103	1
English 1	3	English 2	3
Core B or C	3-4	Core B or C	3-4
Phys. Ed. 1	1	Phys. Ed. 2	1
	19-20		19-20

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 110	2	Music 110	2
Music 65, 66	4	Music 67, 68	4
Music 33	2	Music 34	2
Music 100 or 103	1	Music 100 or 103	1
Elective	3	Elective	3
	16		16

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 171	2	Music 172	2
Music 118	1	Music 119	1
Music 115	1	Music 115	1
Music 100 or 103	1	Music 100 or 103	1
Music 263	2	Music 264	2
Music 265	3	Core B or C	3-4
Core A	3		
	17		14-15

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 231, 232,		Music 299	2
330-333	3	Music 115	1
Music 115	1	Music 100 or 103	1
Music 100 or 103	1	Core B or C	3-4
Core B or C	3-4	Music elective	2
Music elective	2		
Non-Music Elect.	3		
	17-18		13-14

APPLIED CURRICULUM—VOICE

In addition to the required Grade Level 10 in voice, a student completing this curriculum must also achieve Grade Level 3 in piano before graduation. One year of either Italian, French or German is required, as is one course from each Core Group (A, B, and C). A recommended distribution of the courses required in this curriculum follows:

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 110	2	Music 110	2
Music 61, 62	4	Music 63, 64	4
Music 31	1	Music 32	1
Music 113	2	Music 113	2
Music 102 or 105	1	Music 102 or 105	1
English 1	3	English 2	3
Phys. Ed. 1	1	Phys. Ed. 2	1
	18		18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 110	2	Music 110	2
Music 65, 66	4	Music 67, 68	4
Music 33	2	Music 34	2
Music 113	2	Music 113	2
Music 102 or 105	1	Music 102 or 105	1
	15		15

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr*
Music 110	4	Music 110	4
Music 19	2	Music 19	2
Music 263	2	Music 264	2
Music 265	3	Music 102 or 105	1
Music 102 or 105	1	Foreign Lang.	3
Foreign Lang.	3	Core B or C	3
Core B or C	3		
	18		15

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 118	1	Music 119	1
Music 19	2	Music 19	2
Music 218	2	Music 219	2
Music 231, 232, 330-333	3	Music 299	2
Music 102 or 105	1	Music 102 or 105	1
Music elective	3	Music elective	2
		Core A	3
	16		17

APPLIED CURRICULUM—WOODWINDS

Applied music majors whose major instrument is in the woodwind family and who show strong performance ability on another woodwind instrument may qualify for the Applied Curriculum in woodwinds. Approval for admission to this curriculum will not be given by the woodwind faculty until after the first year of study. In addition to the senior recital (which may be given on more than one instrument), the student in this curriculum must present his three solo student recital performances on each of the three major instruments. Grade Level requirements for this curriculum are:

A primary major woodwind instrument: Grade Level 9.

Two secondary major woodwind instruments: Grade Level 7.

Two minor woodwind instruments: Grade Level 4.

Piano: Grade Level 2.

The recommended distribution of the required courses is the same as in the *Applied Curriculum—Band or Orchestra Instrument* (above), with the following changes:

1. Substitution of 4 credit hours in Music 110 and 2 credit hours in Music 115 for the 6 credit hours of electives during the second year.

2. Addition of 2 credit hours in Music 110 to the courses in the third year (increasing the total for the curriculum to 134).

3. Substitution of 4 credit hours in Music 110 for the 4 credit hours of Music electives in the fourth year.

Theory-Composition, Theory-Music History Curriculums

The Theory-Composition Curriculum concentrates on developing skills in musical analysis, composition, and arranging. Students pursuing the Theory-Music History Curriculum find more emphasis on history and less on musical composition.

Students in these curriculums will satisfy the 8 credit hour requirement for participation in a performing organization through registrations in Music 100-105, 115, or 334 (Band, Orchestra, Choral Union, University Choir, Chamber Music, or Collegium Musicum), with at least 4 credit hours being earned in a major performing group (Music 100-105). Majors in these curriculums must present two solo performances on the major instrument on student recitals before graduation.

Another language may be substituted for the indicated French, German, or Italian with the approval of the Chairman of the Theory-Composition Department.

THEORY-COMPOSITION CURRICULUM

An average of at least B in the required freshman and sophomore theory courses (Music 61-68) or the consent of the Chairman of the Theory-Composition Department is required for continuation in this curriculum. A theory-composition major should enter as a freshman having achieved Grade Level 4 on his major instrument, and must complete Grade Level 8 on that instrument before graduation. If piano is not the major instrument, Grade Level 4 in this instrument also must be established. A total of 16 credit hours of courses from Core Groups B and C are required, with no less than 6 credit hours earned in either group. The Major Project (Music 266) must be in theory or composition. A recommended distribution of the required courses in this curriculum follows:

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Music elective	2	Music elective	2	Music elective	2	Music elective	2
Music 61, 62	4	Music 63, 64	4	Music 65, 66	4	Music 67, 68	4
Music 31	1	Music 32	1	Music 33	2	Music 34	2
Music 100-105 or 115	1	Music 100-105 or 115	1	Music 160	2	Music 160	2
English 1	3	English 2	3	Music 100-105, or 115	1	Music 100-105, or 115	1
Core B or C	4	Core B or C	4	French, German, or Italian 1	3	French, German, or Italian 2	3
Phys. Ed. 1	1	Phys. Ed. 2	1				
	18		18		16		16

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Music elective	2	Music elective	2	Music elective	2	Music elective	2
Music 171	2	Music 172	2	Music 51	2	Music 52	2
Music 263	2	Music 264	2	Music 260	2	Music 266	2
Music 265	3	Music 260	2	Music 231, 330-333	3	Music 232, 330-333	3
Music 260	2	Music 100-105, 115, or 334	1	Music 100-105, 115, or 334	1	Music 174	2
Music 100-105, 115, or 334	1	French, German, or Italian 4	3	Core B or C	4	Music 100-105, 115, or 334	1
French, German, or Italian 3	3					Core B or C	4
	17		14		16		18

THEORY-MUSIC HISTORY CURRICULUM

A maximum of 16 credit hours of applied music credit (Music 110) will be counted toward the required Grade Level 7 on the major instrument. If the student's major instrument is not piano, 12 of the elective credit hours may be used to achieve the required Grade Level 4 in that instrument. A student wishing to take more than 6 of the elective credit hours in non-music courses may do so only with the consent of the Chairman of the Theory-Composition Department. The Major Project (Music 266) must be in theory or music history. A recommended distribution of the courses required in this curriculum follows:

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Elective	2	Elective	2	Elective	2	Elective	2
Music 61, 62	4	Music 63, 64	4	Music 65, 66	4	Music 67, 68	4
Music 31	1	Music 32	1	Music 33	2	Music 34	2
Music 100-105, or 115	1	Music 100-105, or 115	1	Music 100-105, or 115	1	Music 100-105, or 115	1
English 1	3	English 2	3	French, German or Latin 1	3	French, German or Latin 2	3
Core B	3	Core B	3	Core B	3	Core B	3
Phys. Ed. 1	1	Phys. Ed. 2	1				
	17		17		17		17

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Elective	2	Elective	2	Music 160	2	Music 160	2
Music 171	2	Music 172	2	Music 332	3	Music 266	2
Music 263	2	Music 264	2	Music 100-105,		Music 100-105,	
Music 265	3	Music 232	3	115, or 334	1	115, or 334	1
Music 231	3	Music 100-105,		Lit. (English		Literature or	
Music 100-105,		115, or 334	1	or Foreign)	3	Art Apprec.	3
115, or 334	1	Core C	4	Core C	4	Core C	4
French, German,		French, German,					
or Latin 3	3	or Latin 4	3				
	18		19		15		14

Music Education Curriculums

Students successfully completing one of the Music Education curriculums will have satisfied course requirements for the Professional Certificate, Grades 1-12, and will be prepared to teach both instrumental and vocal music in these grades. Music majors wishing to qualify for a second teaching field in addition to music at the secondary level should consult the College of Human Resources and Education for requirements in teaching fields.

In order to qualify for student teaching (C&I 104, 189, 190), a student must have a 2.25 grade-point average in all work attempted, and a 2.0 average in education courses (normally C&I 7; Ed. Psych. 105, 106). Students may be called upon to do their student teaching during either semester of the fourth year, and it may be necessary for student teaching to be done outside Monongalia County.

A student following either Music Education curriculum should enter as a freshman having achieved Grade Level 3 on his major instrument, and must complete Grade Level 7 on that instrument to be eligible for graduation. He also must present two solo performances on the major instrument on student recitals before graduation.

The Core Group C requirement must be fulfilled through 8 credit hours in one of the following areas: biology, physical science, chemistry, physics, geology.

MUSIC EDUCATION CURRICULUM—VOCAL EMPHASIS

Students wishing to emphasize preparation in vocal/choral music choose this curriculum. Those whose major instrument is not voice must complete Grade Level 4 in voice; those whose major instrument is not piano must complete Grade Level 3 in piano. Students in this curriculum are required to successfully complete at least one semester in each of the instrument classes (Music 44-47: Woodwind Class, Brass Class, String Class, Percussion Class). A recommended distribution of the required courses in this curriculum follows:

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music 110	1	Music 110	1
Music 44-47	1	Music 44-47	1
Music 61, 62	4	Music 63, 64	4
Music 31	1	Music 32	1
Music 102 or 105	1	Music 102 or 105	1
English 1	3	English 2	3
Core C	4	Core C	4
Phys. Ed. 1	1	Phys. Ed. 2	1
	18		18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music 110	2	Music 110	2
Music 65, 66	4	Music 67, 68	4
Music 33	2	Music 34	2
Music 51	2	Music 52	2
Music 102 or 105	1	Music 102 or 105	1
Hist. 1	3	Hist. 2	3
	16		16

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music 44-47	1	Music 44-47	1
Music 151	3	Music 152	3
Music 102 or 105	1	Music 174	2
Ed. Psych. 105	3	Music 102 or 105	1
C&I 7	2	Ed. Psych. 106	3
Social Sci. 1	3	Social Sci. 2	3
Math. 21, 22 or 15	2	English 35, 36 or 135, 136	3
	17		18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music 44-47	1	Music 102 or 105	1
Music 102 or 105	1	C&I 189	4
English 35, 36, or 135, 136	3	C&I 190	4
Math. 22 or 15	2	C&I 104	4
Health Ed. 102	2		
Art 30	3		
Speech 31 or 34 or Drama 50	3		
	17		15

MUSIC EDUCATION CURRICULUM–INSTRUMENTAL EMPHASIS

Students wishing to emphasize preparation in music for band or orchestra instruments choose this curriculum. The 22 credit hours of applied music (Music 110) in this curriculum are to be used to achieve the following Grade Levels: major instrument–Grade Level 7; voice–Grade Level 1B; piano–Grade Level 2. Those whose major instrument is a keyboard instrument or voice must complete Grade Level 4 on a non-keyboard instrument. Students in this curriculum are required to take 2 semesters each of Music 44, 45, 46, and one semester of Music 47. In addition to 8 semesters of participation in a major instrumental organization (Music 100 or 103), this curriculum also requires two semesters in a major choral group (Music 102 or 105). A recommended distribution of the courses required in this curriculum follows:

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music 110	1	Music 110	1
Music 44-46	1	Music 44-46	1
Music 61, 62	4	Music 63, 64	4
Music 31	1	Music 32	1
Music 100 or 103	1	Music 100 or 103	1
English 1	3	English 2	3
Core C	4	Core C	4
Phys. Ed. 1	1	Phys. Ed. 2	1
	18		18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music 110	1	Music 110	1
Music 110	1	Music 110	1
Music 44-46	1	Music 44-46	1
Music 65, 66	4	Music 67, 68	4
Music 33	2	Music 34	2
Music 51	2	Music 52	2
Music 100 or 103	1	Music 100 or 103	1
Hist. 1	3	Hist. 2	3
Music 102 or 105	1	Music 102 or 105	1
	18		18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music 44-46	1	Music 44-46	1
Music 171	2	Music 172	2
Music 151	3	Music 152	3
Music 100, 103	1	Music 100, 103	3
Ed. Psych. 105	3	Ed. Psych. 106	3
C&I 7	2	Social Sci. 2	3
Social Sci. 1	3	English 35, 36 or 135, 136	3
Math. 21, 22 or 15	2		
	19		18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music 47	1	Music 100, 103	1
Music 100, 103	1	C&I 189	4
English 35, 36 or 135, 136	3	C&I 190	4
Math. 22 or 15	2	C&I 104	4
Health Ed. 102	2		
Art 30	3		
Sp. Com. 31 or 34 or Drama 50	3		
	17		15

Accelerated Curriculums

Students wishing to complete any music curriculum in less than four years may, with the approval of the adviser and the Division Chairman, accelerate their program by attending summer sessions. All requirements of the four-year curriculum must be satisfied.

Combined Applied-Music Education Curriculum

An optional program can be arranged for students who desire to meet the requirements of majors in both Applied Music and Music Education. Admission to this program is by written consent of the Chairman of Applied Music and the Chairman of Music Education after the student has completed two semesters. This curriculum satisfies the course requirements of the Professional Certificate, Grades 1-12.

The numerous possible combinations of Applied Music with Music Education cannot be listed separately in this bulletin. When the student becomes a candidate for this degree, his adviser designates the specific courses which must be taken to satisfy the requirements for both Applied Music and Music Education. By attending summer sessions, it may be possible to complete the combined curriculum in four years.

Courses of Instruction in Music

Music

19. **Introduction to Opera Theatre.** I, II. 0-4 hr., max. credit 16 hr. PR: Consent. Practical work in all aspects of lyric theatre production. Development of lyric theatre stage technique through movement studies, performance in major and minor roles and operatic scenes, and advanced production techniques. Qualified students will undertake production-direction projects under supervision.

30. **Appreciation of Music.** I, II. 3 hr. An introductory course designed to develop an appreciation and understanding of the significance of music as a fine art, and to help the student develop intelligent listening habits. Musical terminology and historical data are presented as needed but central to the course is the listening experience and listening assignments are included. (Not open to music majors.)

31. **Introduction to Music Listening.** I. 1 hr. Guided listening to important works from all historical periods with emphasis upon the development of awareness of stylistic traits such as harmonic idiom, melodic structure, tonal movement, texture, rhythm, etc. For music majors only.

32. **Introduction to Music Listening.** II. 1 hr. PR: Music 31. Continuation of Music 31.

33. **Music Literature.** I. 2 hr. PR: Music 32 or consent. A study of vocal literature, solo and choral, with emphasis on the historical development of style. The course is centered on familiarity with a selected repertory of works presented in historical context.

34. **Music Literature.** II. 2 hr. PR: Music 32 or consent. A course similar to Music 33 but devoted to instrumental music. Concentration on music after 1700.

41. **Music As an Art and Science.** I, II. 2 hr. Fundamental music skills and knowledge for elementary classroom teachers. Course includes a piano lab arranged. (Not open to music majors.)

42. **Music Materials and Procedures.** I, II. 2 hr. PR: Music 30 or equiv. and Music 41. Methods and materials for elementary classroom teachers. Course includes a piano lab arranged. (Not open to music majors.)

44. **Woodwind Class.** I, II. 1 hr. Beginning instruction on woodwind instrument. May be repeated for credit; max. credit 2 hr.

45. **Brass Class.** I, II. 1 hr. Beginning instruction on brass instrument. May be repeated for credit; max. credit 2 hr.

46. **String Class.** I, II. 1 hr. Beginning instruction on stringed instruments. May be repeated for credit; max. credit 2 hr.

47. **Percussion Class.** I, II. 1 hr. Beginning instruction on percussion instruments.

51. **Conducting.** I. 2 hr. A basic course in conducting techniques, both choral and instrumental.

52. **Conducting.** II. 2 hr. PR: Music 51. Continuation of Music 51, including more advanced score reading and conducting techniques, both choral and instrumental.

61. **Aural Theory.** I, II. 2 hr. The four aural theory courses (Music 61, 63, 65, and 67) form a unit of instruction devoted to the development of aural skills such as sightsinging, melodic and harmonic dictation, identification of chords, chord progressions, modulations and non-harmonic tones. Each student works independently with recorded, programmed material. The sequence and selection of material for each semester is adapted to the student's individual needs.

62. **Written Theory.** I, II. 2 hr. A study of elementary theory (scales, keys, intervals) and an introduction to diatonic harmony (part-writing and analysis).

63. **Aural Theory.** I, II. 2 hr. PR: Music 61. Continuation of Music 61.

64. **Written Theory.** I, II. 2 hr. PR: Music 62. Continuation of Music 62. A study of diatonic harmony including part-writing, harmonization of melodies, and harmonic analysis with triads, dominant seventh chords and non-harmonic tones.

65. **Aural Theory.** I, II. 2 hr. PR: Music 63. Continuation of Music 63.

66. **Written Theory.** I, II. 2 hr. PR: Music 64. Continuation of Music 64. A study of diatonic and chromatic harmony including part-writing, harmonization of melodies and harmonic analysis with seventh chords, modulations and foreign chords.

67. **Aural Theory.** I, II. 2 hr. PR: Music 65. Continuation of Music 65.

68. **Analysis of Music.** I, II. 2 hr. PR: Music 66. The study of musical compositions with consideration of melody, rhythm, harmony, texture, form, etc., and how these function to produce an organic work of art.

100. **Band.** I, II. 0 to 1 hr. Wind Symphony, Concert Band, and Marching Band.

102. **University Choral Union.** I, II. 0 to 1 hr.

103. **University-Community Symphony Orchestra.** I, II. 0 to 1 hr.

105. **University Choir.** I, II. 0 to 1 hr.

110. **Applied Music.** I, II. 0-4. Open to qualified students in any field. Course may be repeated as many times as necessary or desirable. Credit given at the following rates:

1. For music major, 2 hours for each 30-minute weekly lesson.
2. For other students, a maximum of one 30-minute lesson per week for one hour of credit.
3. Students in lower grade levels of Applied Music may be grouped in small classes for initial instruction. 1-2 hr. credit.

113. **Diction for Singers.** I, II. 2 hr. PR: Consent. A study of phonetics, phonetic symbols, and pronunciation as involved in singing in English, Italian, Latin, Spanish, German, and French. Other aspects of language that will aid in comprehension of song, oratorio and operatic texts will be considered. Course may be repeated for credit; max. credit 8 hours.

115. **Chamber Music.** I, II. 0 to 1 hr. PR: Consent. This course provides the opportunity to perform in small ensembles. Course may be repeated for credit.

118. **Methods and Pedagogy in Major and Applied Fields.** I. 1 hr. PR: Music 110.

119. **Methods and Pedagogy in Major and Applied Fields.** II. 1 hr. PR: Music 118.

151. **Music Education.** I. 3 hr. PR: Music 51. Methods, materials and administration of elementary and secondary music programs. A weekly laboratory session will be arranged.

152. **Music Education.** II. 3 hr. PR: Music 151. A continuation of Music 151 including some opportunities for specialization in the area of the student's primary interest. A weekly laboratory session will be arranged.

160. **Composition.** I, II. 2 hr. PR: Music 68 or consent. Creative writing. Course may be repeated for credit. Max. credit 8 hr.

171. **Instrumentation.** I. 2 hr. PR: Music 64. Study of the characteristics of band and orchestral instruments and their use in scoring.

172. **Orchestration and Band Arranging.** II. 2 hr. PR: Music 171. Problems in scoring for orchestra ensembles and band.

174. **Choral Arranging.** II. 2 hr. PR: Music 64. A study of the characteristics and problems in scoring for choral combinations.

218. **Repertoire.** I. 0-2 hr.

219. **Repertoire.** II. 0-2 hr.

230. **Music of Africa.** I. 3 hr. A survey of the traditional music of selected areas of Africa south of the Sahara with particular reference to East Africa. Study of the diverse musical cultures with emphasis on the historical background, instruments, ensembles, forms, styles, and the music in its social context.

231. **History of Music.** I. 3 hr. PR: Music 33 and 34 or consent. A survey of music history from the pre-Christian era through the mid-eighteenth century with emphasis on musical styles, historical perspective, and basic bibliography.

232. **History of Music.** II. 3 hr. PR: Music 33 and 34 or consent. A survey of music history from the mid-eighteenth century to the present with emphasis on musical styles, historical perspective, and basic bibliography.

260. **Upper Division Composition.** 2 hr. PR: Four semesters Music 160 or consent based on scores submitted. Creative writing with emphasis on practical composition for performance. May be repeated for credit.

263. **Counterpoint.** I. 2 hr. PR: Music 68 or consent. Sixteenth century counterpoint.

264. **Counterpoint.** II. 2 hr. PR: Music 68 or consent. Eighteenth century counterpoint.

265. **Analysis of Musical Form.** I. 3 hr. PR: Music 68 or consent. A detailed study of the structure of music.

266. **Major Project in Theory, Composition, or Music History.** 2 hr. PR: Music 68.

267. **Electronic Music.** I. 2 hr. PR: Music 68 and consent. A study of the technology of producing electronic music. This will include a study of the methods of producing electronic compositions, the relationship between sound signal and sound perceived, ear training, analysis of examples from the electronic music literature, and composition of electronic music.

268. **Electronic Music.** II. 2 hr. PR: Music 267. A continuation of Music 267.

299. **Recital.** I, II. 0-2 hr. Not available for graduate credit. To be used to fulfill applied major graduation requirement only when the student has achieved Grade Level 9. Students who have reached Level 6 may receive 1 hour credit, which may not be used to fulfill graduation recital requirement.

330. **Survey of Vocal Music.** I. 3 hr. PR: Music 33-34 or equiv. and consent. A survey of masses, oratorios, cantatas, and operas from the late Renaissance to the 20th century. Solo repertoire will not be included.

331. **Survey of Instrumental Music.** II. 3 hr. PR: Music 33-34 or equiv. and consent. A survey of instrumental ensemble music, chamber music, concertos, symphonies and other orchestral music from the late Renaissance to the twentieth century. Solo repertoire will not be included.

332. **Studies in Contemporary Music.** I. 3 hr. PR: Music 33-34.

333. **Survey of Chamber Music.** II. 3 hr. PR: Music 33-34.

334. **Collegium Musicum.** I, II. 1-2 hr. Performance of outstanding musical works not in the standard repertory. Although open as a performance group to upperclassmen, graduate students will select appropriate vocal and instrumental music, investigate modes of performance, prepare any necessary editions, and direct rehearsals under supervision. May be repeated for credit.

340. **Band, Orchestra, Opera Theatre and Music Education Clinics.** 1-2 hr. Special problems of organization and development of the various performing organizations. Lecture, laboratory, and discussion groups.

341. **Music in the Elementary School.** I, II. 3 hr. PR: Music 30, 41, 42, or equiv. Development of skills, procedures, techniques, and materials used by the general classroom teacher of music in grades K-8. (Not open to music majors.)

342. **The Teaching of Music Appreciation.** 3 hr. PR: Music 30, 41, 42, or equiv. A review of information, materials, sources, and techniques involved in teaching appreciation of music in the public schools. (Not open to music majors.)

343. **Contemporary Techniques in Classroom Music.** 3 hr. PR: Music 152 or consent. Intensive study of the principles and practice of contemporary techniques in elementary and junior high school classroom music, including those of Orff and Kodaly.

346. **Music in the Junior High School.** 2 hr. PR: Music 151-152 or equiv. A consideration of the potentialities and special needs of the junior high school in music education; programs, procedures, and materials.

380. **Remedial Theory.** I, II. 0 hr. A course for graduate students who are deficient in undergraduate theory requirements.

Division of Art

Each student entering the Division of Art is encouraged to become a member of a community of creative artists formed by the faculty and student body of the Division. The structure of the curricula is such that the art student is offered an opportunity to explore many of the important fields of visual arts. Close relationships between art students and the faculty are maintained so that students are afforded the opportunity of sharing in the creative insights and personal works of a staff of professional artists and educators.

Undergraduate programs in art are concentrated upon the idea of giving a full range of scholarly and studio experience to potential artists and teachers. The Division of Art is committed to a high standard of excellence in all of its activities.

The Bachelor of Art degree is conferred upon any student who satisfies all departmental and entrance requirements, completes the Studio Curriculum or Art Education curriculum, and who complies with the general regulations of the University concerning degrees.

A candidate for a degree in the Division of Art must establish a minimum average of 2.0 (C) grade points per semester hour in art courses. In addition, he may be asked to present portfolio of selected works for examination and evaluation by a faculty committee. The committee is empowered to make recommendations regarding the student's continuing work toward a degree in art.

Bachelor of Art Degree

The Bachelor of Art degree is conferred upon any student who complies with the general regulations of the University concerning degrees, satisfies all entrance and departmental requirements, and completes a curriculum in art with an average of 2.0 (C) grade points per semester hour.

Transfer students must establish transfer credit from other institutions during the first semester in which they are enrolled in the Division of Art.

STUDIO CURRICULUM—VISUAL ARTS

In this curriculum students are given preparation in the following basic disciplines: drawing, design, art history, painting, sculpture, and printmaking. Students completing this program are prepared for work as professional artists in the visual arts. In addition, graduates with this background may prepare for careers in a wide range of cultural, commercial, and industrial activities.

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Art 11	3	Art 12	3	Art 105	3	Art 106	3
Art 30	3	Art 122	3	Art 113	3	Art 114	3
Art 121	3	English 2	3	Art 126	3	Art 123	2
English 1	3	Core Group C	4	Core Group B	3	Art 127	3
Core Group C	4	Music 30	3	Core Group C	4	Core Group A	3
Phys. Ed. 1	1	Phys. Ed. 2	1	Elective	2	Core Group B	3
	17		17		18		17

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Art 117 or 130	3	Art 118 or 113	3	Art 151	3	Art 151	3
Art 211	3	Art History	3	Art 213	3	Art 214	3
Art History	3	Core Group A	3	Art 216 or 230	3	Art 217 or 231	3
Core Group B	3	Core Group B	3	Electives	6	Electives	6
Electives	3	Electives	3				
	15		15		15		15

ART EDUCATION CURRICULUMS

The student who wishes to prepare for teaching in the public schools should choose one of the following curriculums. To qualify for teaching art and a second field in the junior and senior high school, the student should complete the Art Education curriculum, grades 7-12. To qualify for teaching art in the elementary through the senior high school, the student should complete the Art Education curriculum, grades 1-12.

Art Education Curriculum—Grades 7-12

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Art 11	3	Art 12	3	Art 113	3	Art 114	3
Art 105	3	Art 106	3	Art 126	3	Art 127	3
Art 121	3	Art 122	3	Sp. Com. 31 or 34		English 25	3
English 1	3	English 2	3	or Drama 50	3	English 111	3
Core Group C	4	Core Group C	4	English 24	3	Hist. 2	3
Phys. Ed. 1	1	Phys. Ed. 2	1	Hist. 1	3	Math. 21, 22	
				Math. 21, 22		or 15	2
				or 15	2	Elective	1
				Elective	1		
	17		17		18		18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Art 117*	3	Art 118*	3	English 150	3	Art 260	3
English 121	3	Art 123	2	English, choice of		C&I 104	4
English, choice		Art 166	3	163, 164, 263,		C&I 188	8
of 131, 266,		English 122	3	264, 265,			
or 220	3	English, choice		267, 365	3		
Soc. Sci. 1	3	of 161, 162, 255,		English, choice			
C&I 7	2	261, or 262	3	of 125, 236,			
Ed. Psych. 105	3	Soc. Sci. 2	3	337, or Hu-			
		Ed. Psych. 106	3	manities 142	3		
				Music 30	3		
				Health Ed. 102	2		
				Ed. Psych. 260	3		
	17		20		17		15

*Art Education majors with emphasis other than painting in major area may take 6 hr. of Art 151 instead of Art 117 and 118 with approval of the adviser.

Art Education Curriculum—Grades 1-12

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Art 11	3	Art 12	3
Art 105	3	Art 106	3
Art 121	3	Art 122	3
English 1	3	English 2	3
Core Group C	4	Core Group C	4
Phys. Ed. 1	1	Phys. Ed. 2	1
	17		17

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Art 113	3	Art 114	3
Art 126	3	Art 127	3
Art 130	3	Art 131	3
Hist. 1	3	Art elect.	3
Sp. Com. 11 & 12, 13 or 14, or Drama 50	3	Music 30	3
C&I 7	2	Hist. 2	3
	17		18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Art 117	3	Art 118	3
Art (C&I) 165	3	Art (C&I) 166	3
English 35 or 135	3	English 36 or 136	3
Soc. Sci. 1	3	Soc. Sci. 2	3
Math. 21 & 22 or 15	2	Math. 21 & 22 or 15	2
Ed. Psych. 105	3	Ed. Psych. 106	3
	17		17

Fourth Year*

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
C&I 104	4	Art 211	3
C&I 187	4	Art 260	3
C&I 188	4	Art (Advanced Studio elect.)	3
		Health Ed. 101 or 102	2
		Elective (CAC)	3
	12		14

*The sequence of the two semesters in the fourth year may be reversed.

Courses of Instruction in Art

Art

1. **Creative Expression in the Fine Arts.** I, II. 2 hr. Primarily for Elementary Education majors. Exploratory course designed to familiarize student with a variety of two-dimensional media.

2. **Creative Expression in the Applied Arts.** I, II. 2 hr. Course similar to Art 1 but designed to investigate the expressive potential of three-dimensional materials.

11. **Drawing.** I, II. 3 hr. Foundation course that teaches the basic principles of drawing.

12. **Drawing.** I, II. 3 hr. PR: Art 11. Continuation of Art 11.

30. **Appreciation of Fine Arts.** I, II. 3 hr. A study of outstanding works of art from times past as well as from the present day. Topics are: (1) materials with which the artist works, (2) sources of the art impulse, and (3) relationship of art to the civilization producing it.

105. **Survey of Art.** I. 3 hr. History of art from pre-historic times to Renaissance.

106. **Survey of Art.** II. 3 hr. PR: Art 105. History of art from Renaissance to present.

113. **Painting.** I. 3 hr. PR: Art 12, 121. Introductory course in various concepts and media.

114. **Painting.** II. 3 hr PR: Art 113 or equiv. Continuation of Art 113.

117. **Painting.** I. 3 hr. PR: Art 114 or equiv. An intermediate painting course concentrating on problems of concepts and media.

118. **Painting.** II. 3 hr. PR: Art 117 or equiv. Continuation of Art 117.

121. **Fundamentals of Design.** I. 3 hr. Basic course in visual perception, composition, manipulation of materials, and the exploration of two-dimensional formal elements.

122. **Fundamentals of Design.** II. 3 hr. PR: Art 121. Continuation of Art 121, emphasizing the study of three-dimensional formal elements.

123. **Lettering.** II. 2 hr. Offered alternate years. Basic techniques of lettering and their application.

126. **Modeling-Sculpture.** I. 3 hr. PR: Art 12, 122 or equiv. Fundamentals of sculptural concepts, techniques, and materials.

127. **Modeling-Sculpture.** II. 3 hr. PR: Art 126 or equiv. Continuation of Art 126.

130. **Printmaking.** I. 3 hr. PR: Art 12, 122 or equiv. Introductory course in the processes of printmaking.

131. **Printmaking.** II. 3 hr. PR: Art 130 or equiv. Continuation of Art 130.

151. **Special Problems.** I, II. 1-3 hr. PR: Primarily for Art majors/Consent. May be repeated for max. of 12 hr.

165. **Art Education in the Elementary Schools.** I. 3 hr. PR: Art 11, 121, or equiv.

166. **Art Education in the Secondary Schools.** II. 3 hr. PR: Art 11, 121, or equiv.

211. **Figure Drawing.** I, II. 3 hr. PR: Art 12, 122 or equiv. A drawing course in compositional structure from the figure.

213. **Painting.** I. 3 hr. PR: Art 118 or equiv. Advanced painting course emphasizing problems, techniques, and media. (Offered in evening.)

214. **Painting.** II. 3 hr. PR: Art 213 or equiv. Continuation of Art 213. (Offered in evening.)

216. **Painting.** I. 3 hr. PR: Art 214 or equiv. A senior tutorial painting course. (Offered in evening.)

217. **Painting.** II. 3 hr. PR: Art 216 or equiv. A senior tutorial painting course. (Offered in evening.)

230. **Printmaking.** I. 3 hr. PR: 6 hr. printmaking or equiv. Exploration of conventional and experimental printmaking techniques.

231. **Printmaking.** II. 3 hr. PR: Art 230 or equiv. Continuation of Art 230.

250. **Renaissance Painting.** I. 3 hr. PR: Art 105, 106, or equiv. Study of painting in Italy from 1400 to 1600. (Offered in evening.)

260. **Modern Painting.** II. 3 hr. PR: Art 105, 106, or equiv. Developments in painting from French Revolution to present day. (Offered in evening.)

310. **Painting.** I, II. 3-9 hr. PR: 12 hr. of painting or equiv. Independent studio work with interdisciplinary critiques. May be repeated for max. of 9 hr. (Offered in evening.)

320. **Printmaking.** I, II. 3-9 hr. PR: 12 hr. of printmaking or equiv. Independent studio work with interdisciplinary critiques. May be repeated for a max. of 9 hr.

321. **Administration and Supervision of Art.** II. 2 hr. PR: Art 220 or equiv. Mainly for administrators and school principals who wish to become informed about art programs and the philosophies underlying them.

325. **Secondary School Art.** II. 3 hr. PR: Art 12, 122, 114 or equiv. Information and working skills desirable for the teaching of art on secondary school level.

326. **Sculpture.** I, II. 3-9 hr. PR: 12 hr. of sculpture or equiv. Independent studio work with interdisciplinary critiques. May be repeated for max. of 9 hr.

390. **Study of Original Works of Art.** S. 6 hr. PR: Art 105, 106, or consent. Directed study in the museums and libraries in an urban center such as Washington or New York; study of the architectural developments of the locality.

Division of Drama

The WVU Division of Drama offers a professional program of theatre preparation for the student seeking artistic development for a career in theatre or in other fields where theatre skills are desirable. The four-year study leading to the Bachelor of Fine Arts (B.F.A.) degree is nationally recognized for its heavy emphasis on artistic development.

Courses in all areas of theatre are offered on the basic concept of providing formal classes for content and theory combined with practical application and experience in the laboratory. The 80 to 100 play productions in five different theatre areas present the student with numerous opportunities to develop his own personal abilities. The diversified program in oral interpretation gives each student an opportunity to attain a high level of achievement in oral expression.

The Creative Arts Center building is one of the finest facilities in the nation for drama and includes some of the most modern equipment available for theatre experience and study. Productions represent a wide range within the dramatic repertoire including childrens' plays and puppetry.

The aim of the drama curriculum is to provide the drama major with an emphasis on a special area of theatre and to supply a wide, professional scope of total theatre environment so that each student will have a sound, well-rounded knowledge of theatre art. As a result of this program of preparation, graduates of the Division are working in the professional theatre, radio, television, and in motion pictures. Many graduates have chosen careers in costume design, commercial sales work, make-up, department store style shows, lighting design, and similar areas in which theatre skills provide a unique advantage. The student interested in preparing himself for a career in drama will realize that here is one of the distinctive theatre programs in the nation.

University Theatre. The Division of Drama produces, under the name University Theatre, a complete season of faculty directed play productions. The season is open to the public under regular theatre management procedures with box office facilities offering the sale of season and reserved seat tickets.

Studio Theatre. The Division of Drama maintains separate facilities for the production of new and unusual plays, and for classical and experimental works which may not find exposure on the commercial stage. The studio program provides a training ground for actors, writers, directors, designers, and technicians. Plays in this theatre are directed by faculty or advanced students and are open or closed to the general public, depending on the purpose of the production.

One-Act Play Productions. A regular laboratory performance schedule maintained for student directed and acted one-act plays. During the academic year as many as sixty productions are performed before student audiences.

Oral Interpretation. Students enrolled in oral interpretation courses offer individual and group recitals in regularly scheduled performances open to the public. A wide range of special programs are also offered to civic, religious and other organizations, including radio and television appearances.

Verse Choir. The Division of Drama sponsors a verse choir for major and nonmajor students with scheduled public performances.

Children and Puppet Theatre. Theatre majors operate a complete puppet theatre program offering plays and productions for children. The Creative Arts Center operates a puppet-mobile project which tours in the state.

National Collegiate Players. The Division sponsors a chapter of the national drama fraternity.

Bachelor of Fine Arts in Drama

The B.F.A. is conferred upon any student who complies with the general regulations of the University concerning degrees, satisfies all entrance and Division requirements, and completes one of the curriculums of the Division of Drama with a grade-point average of 2.0 (C) per semester hour.

A. Acting-Directing-Oral Interpretation
B. Design and Technical Theatre
C. Acting-Voice
D. General Theatre

For admission to the junior year in the Division of Drama, a student must have established a 2.0 (C) grade-point average.

Transfer students must establish transfer credit from other institutions during the first semester in which they are enrolled in the Division of Drama.

Students are responsible for correctly fulfilling all requirements. Each student should review his course requirements both before and after every registration period so that errors or omissions will be detected immediately.

Teacher Certification

Certification in Drama is a part of the combined Speech-Drama teacher-preparation program in the College of Arts and Sciences.

Drama Curriculums

The applied program provides a drama student with a very complete experience in all of the basic theatre skills and crafts. In addition to the general scope of the program, the student may select an area of specialization in acting-directing-oral interpretation, acting-voice, design and technical theatre, or general theatre.

ACTING-DIRECTING-ORAL INTERPRETATION

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Drama 75	3	Drama 50	3
Drama 100	3	Drama 51	3
Drama 101	1	Drama 76	1
Drama 185	3	English 2	3
English 1	3	Art 30 (Core A)	3
Speech Com. 31	3	Core B	3
Phys. Ed. 1	1	Phys. Ed. 2	1
	17		17

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Drama 102	3	Drama 103	3
Drama 110	3	Drama 160	3
Drama 150	3	Music 30	
Drama 160	3	(Core A)	3
Drama 175	3	Drama 176	1
Core B	3	Elective	3
		Core C	
	18		16

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Drama 104	3	Drama 161	3
Drama 161	3	Drama 200	
Drama 180	3	Level course	3
Drama 250	3	Drama 276	1
Drama 275	3	Drama 280	3
Core C	3	Core C	3
		Drama 101	1
		Elective	3
	18		17

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Drama 260	3	Drama 200	
Drama 281	3	Level course	3
Drama 286	3	Drama 251	3
Elective	3	Drama 260	3
Core B	3	Electives	6
Core C	3	Core B	3
	18		18

In this option students should take Music 110, Voice, for 2 credit hours as a part of the electives. Core subjects must be taken as specified in the WVU Core Curriculum regulations. It is recommended that 15 credit hours of free electives be in areas other than Drama courses.

ACTING-VOICE

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Drama 75	3	Drama 50	3
Music 61, 62	4	Drama 51	3
Music 110°	2	Drama 76	1
Music 110°	1	Music 63, 64	4
English 1	3	Music 110°	2
Art 30 (Core A)	3	Music 110°	1
Phys. Ed. 1	1	English 2	3
		Phys. Ed. 2	1
	17		18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Drama 100	3	Drama 101	3
Drama 102	2	Drama 104	3
Drama 160	3	Drama 160	3
Drama 175	3	Drama 176	1
Music 110°	2	Music 110°	2
Music 110°	1	Music 110°	1
Core B	3	Core C	3
	18		16

Third Year				Fourth Year			
*First Sem.**	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Drama 150	3	Drama 110	3	Drama 185	3	Drama 103	3
Drama 161	3	Drama 161	3	Drama 200 Level		Drama 260	3
Drama 180	3	Drama 276	1	Courses**	6	Drama 280	3
Drama 275	3	Music 110*	2	Drama 260	3	Music 110*	2
Music 110*	2	Music 19	3	Music 110*	2	Core B	3
Core B	3	Core B	3	Core C	3	Core C	3
		Core C	3				
	17		18		17		17

*Students must attain a voice Level of 7 and piano Level of 2B.
**Choice of courses depends upon which option the student is following. This will be determined in counsel with the adviser.

DESIGN AND TECHNICAL THEATRE

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Drama 75	3	Drama 50	3	Drama 102	3	Drama 103	3
Drama 100	3	Drama 101	2	Drama 104	3	Drama 160	3
Drama 101	1	Art 11	3	Drama 110	3	Music 30 (A)	3
Drama 185	3	English 2	3	Drama 160	3	Art 30	3
English 1	3	Core B	3	Art 113	3	Core C	3
Speech Com. 31	3	Phys. Ed. 2	1	Core B	3	Elective	3
Phys. Ed. 1	1						
	17		15		18		18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Drama 161	3	Drama 161	3	Drama 200		Drama 200	
Drama 180	3	Drama 202	3	Level course	3	Level course	6
Drama 200		Drama 204	3	Drama 260	3	Drama 260	3
Drama 203	3	Core C	3	Drama 286	3	Art Elective	3
Level course	3	Elective	6	Elective	3	Elective	2
Elective	3			Core B	3	Core B	3
Core C	3			Core C	3		
	18		18		18		17

It is recommended that 17 credit hours of free electives be in areas other than drama. Subjects in Art or other areas outside the Division of Drama may be considered.

Fourth-year students will have the opportunity to design productions and do some technical theatre direction under faculty supervision (Drama 260).

GENERAL THEATRE

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Drama 75	3	Drama 30	3
Drama 100	3	Drama 50	3
Drama 101	1	Drama 101	1
Drama 185	3	English 2	3
English 1	3	Art 30 (A)	3
Speech Com. 31	3	Core B	3
Phys. Ed. 1	1	Phys. Ed. 2	1
	17		17

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Drama 102	3	Drama 103	3
Drama 104	3	Drama 110	3
Drama 150	3	Drama 160	3
Drama 160	3	Music 30	3
Core B	3	Elective	3
		Core C	3
	15		18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 150	3	Drama 161	3
Drama 161	3	Drama 200	
Drama 180	3	Level course	6
Drama 200		Drama 285	3
Level course	3	Core B	3
Elective	3	Core C	3
Core C	3		
	18		18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Drama 200		Drama 200	
Level course	3	Level courses	6
Drama 260	3	Drama 260	3
Drama 286	3	Electives	6
Electives	6	Core B	3
Core C	3		
	18		18

Students in this option may not select Drama 176, 276, or 251.

It is recommended that 18 credits of free electives be in areas other than drama courses. Subjects in art, music, speech, or other areas outside the Division of Drama should be considered.

Courses of Instruction in Drama

Drama

30. **Appreciation of Drama.** I, II. 3 hr. An introductory course designed to develop an appreciation and understanding of drama as a fine art. Open to all students.

50. **Oral Interpretation.** I, II. 3 hr. Development of mental and emotional responsiveness to written materials. Techniques of communicating such material to others through oral reading. Open to all students.

51. **Vocal Techniques in Acting.** II. 3 hr. Emphasis on vocal development and voice training for actors.

75. **Acting.** I, II. 3 hr. Basic theories and concepts in stage acting for the beginning student. Emphasis is placed on the physical, intellectual, emotional and personality languages of the art of acting. Open to all students.

76. **Actors Studio.** II. 1 hr. PR: Drama 75 or consent. Laboratory experience in movement, physical control, and pantomime for the actor.

100. **Stagecraft.** I, II. 3 hr. Lecture course in elementary problems of scenery construction, scene painting, and stage lighting.

101. **Theatre Workshop.** I, II. 1-3 hr. Laboratory for production of University plays and informal stimulation of interest in creative arts. Open to all students.

102. **Scene Design.** I, II. 3 hr. Introduction to problems of creating stage settings. Elementary consideration of styles of production. Practice in techniques of scene design.

103. **Theatre Lighting Design.** I, II. 3 hr. Basic techniques in stage lighting. Opportunity for practical experience on University Theatre lighting crews.

104. **History and Design of Costumes.** I, II. 3 hr. A survey of historical stage costuming with basic design including rendering techniques of costumes for the stage.

110. **Theatre Makeup.** I, II. 3 hr. Lecture-laboratory courses in art of stage makeup. Practical experience provided by doing makeup for University Theatre productions.

150. **Advanced Oral Interpretation.** I, II. 3 hr. PR: Drama 50. Content and form of various types of literature, and advanced techniques for their oral presentation.

160. **Theatre Performance and Rehearsal Laboratory.** I, II. 1 to 6 hr. PR: Consent. Participation in assigned theatre projects. Appreciation of creativity and performance techniques in theatre. Majors only. Max. credit 6 hr.

161. **Theatre Performance and Rehearsal Laboratory.** I, II. 1 to 6 hr. PR: Drama 160 or consent. Participation in assigned theatre projects. Appreciation of creativity and performance techniques in theatre. Majors only. Max. credit 6 hr.

175. **Intermediate Acting.** I. 3 hr. PR: Drama 75 or consent. Continuation of acting theories and concepts. Emphasis on character portrayal theories.

176. **Actors Studio.** II. 1 hr. PR: Drama 76, 175 or consent. Laboratory experience in character portrayal and acting techniques through the use of staged scenes.

179. **Directed Theatre Activities.** I, II. 0 to 4 hr. Assigned theatre projects, supervised by faculty. Non-majors. Max. credit in any one semester, 3 hr.

180. **Directing.** I, II. 3 hr. Fundamentals of directing stage plays. Emphasis on work of director in relation to actor, stage, business, composition, movement and rehearsal schedule.

185. **History of the Theatre.** I. 3 hr. An examination of the major periods of theatre history through study of the important playwrights of each era.

202. **Advanced Scene Design.** II. 3 hr. PR: Drama 100 and 102, or consent. Lecture and laboratory in theories of scene design for stage and television, including actual construction of designs. Open to juniors, seniors, and graduate students.

203. **Advanced Theatre Lighting Design.** I. 3 hr. PR: Drama 103 or consent. Advanced theories of lighting and design for the stage. Course includes practical experience with advanced lighting equipment.

204. **Advanced Costume Design.** II. 3 hr. PR: Drama 104 or consent. Individual study in design styles and techniques. Survey of the position of costume design in theatre today.

250. **Advanced Problems in Interpretation.** I. 3 hr. PR: Drama 50 and consent. Designed to deal with individual problems of advanced students in interpretation.

251. **Professional Reading.** II. 3 hr. PR: Consent. Intensive training in interpretation. Designed to meet needs of individual. Full-length public recital prepared and presented. Limited enrollment.

252. **Art of Storytelling.** S. 3 hr. PR: Consent. Principles involved in effective presentation of stories, with practical experience in classroom and before audiences. Stories of all types for adults and children studied.

260. **Theatre Performance and Rehearsal Laboratory.** I, II. 1 to 6 hr. PR: Drama 161 or consent. Participation in assigned theatre projects. Appreciation of creativity and performance techniques in theatre. Majors only. Max. credit, 6 hr.

275. **Advanced Acting.** I. 3 hr. PR: Drama 75 and consent. Advanced theories in acting to include script and style analysis, modern and historical.

276. **Actors Studio.** II. 1 hr. PR: Drama 76, 176, 275, or consent. Advanced laboratory experience in acting and production styles of historical and modern theatre through the use of staged scenes.

280. **Advanced Play Directing.** II. 3 hr. PR: Drama 180 or consent. Emphasis on the work of the director as an integrating artist. Display of high level of proficiency in direction of a one-act play required of all students enrolled.

281. **Theatre Dialects.** I, II. 3 hr. PR: Consent. Study and mastery of fifteen common dialects used in theatre, motion pictures and television.

282. **Creative Dramatics.** II. 3 hr. PR: Drama 75 or consent. The study and practice of creative dramatic activity as a method of learning and self-development for children.

284. **Puppetry.** I. 3 hr. PR: Drama 75 or consent. A comprehensive survey of construction and manipulation techniques of puppets. Includes an evaluation of the role of puppetry in child behavior and therapy techniques.

285. **Advanced History of Theatre.** II. 3 hr. Historical survey of theatre from primitive times to present. Includes both oriental and occidental theatres.

286. **Drama Criticism and Aesthetics.** I. 3 hr. A survey of chief critical and aesthetic theories of drama—ancient, modern, and contemporary.

290. **Playwriting.** II. 3 hr. PR: Consent. Development of creative ability in dramatic composition. Study of techniques and problems of playwriting. Of cultural value, but primarily a writing course.

375. **Styles of Acting and Directing.** II. 3 hr. PR: Drama 180 and 280, or consent. Extensive and intensive study of acting and directing styles.

College of Engineering

Engineering is the profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways of economically utilizing the materials and forces of nature for the benefit of mankind.

The western world, and especially the United States, has often been characterized as a "technological society." This phrase reflects the great impact that engineering has had on western society. In almost every aspect of human enterprise, the activities of the engineer are playing an increasingly important role and these activities will continue to have far-reaching social, economic, and political consequences in the world of the future.

Forecasts of the expected state of the world by the year 2000 suggest that large-scale systems will be created for the development, control, and use of our natural resources; and that development will continue in automated manufacturing, synthetic foods, rapid transportation systems, space programs, defense systems, and bio-social systems having to do with medical advances, housing, community development, and pollution control. Engineering will play the major role.

Society's needs in the decades ahead will demand engineering talent on a scale never before seen. The engineer will be called upon, not only to create, but to coordinate technological advances more effectively into large scale social systems such as vast metropolitan complexes.

Old in tradition, but young in spirit, the College of Engineering was established in the last half of the nineteenth century, awarding its first four-year baccalaureate degree in 1891. The Engineering Building, occupied in 1961, has been carefully planned to enable the College to offer a variety of educational experiences to engineering students. The teaching laboratories are equipped with modern instruments, machines, and tools to improve and enrich the student's understanding of engineering principles and problems. Both analog and digital computer laboratories are available for classroom work.

The College's programs are administered through seven basic engineering departments: Aerospace, Agricultural, Chemical, Civil, Electrical, Industrial, and Mechanical Engineering and Mechanics. Its undergraduate programs, long recognized by industry as ranking with the best in the nation, are accredited by the Engineers' Council for Professional Development. The curricula have been planned to give the student a balanced background in the basic sciences, engineering sciences, engineering analysis, humanistic-social studies, and engineering synthesis and design. This blend of science and practice has been designed to give the student the tools to solve today's problems and the background to develop the expertise needed for the future.

To assist the student in his education as a professional engineer, the College staff uses modern teaching techniques, including programmed material, guest lectures by visiting authorities, seminars, team project assignments, and other techniques to provide a breadth of experience.

Graduate programs, dedicated to the development of engineering practice, engineering science, and research, are offered in numerous creative specialties. Both master's and doctor's degrees are available. These exciting programs, where the frontiers of knowledge are explored through study and research, provide an academic environment in which all programs—undergraduate and graduate—are constantly updated to give the student professional education needed in a technological-scientific society.

The College of Engineering is organized into the following departments:

Aerospace Engineering (A.E.)
Agricultural Engineering (Ag.E.)
Chemical Engineering (Ch.E.)
Civil Engineering (C.E.)
Electrical Engineering (E.E.)
Industrial Engineering (I.E.)
Mechanical Engineering and Mechanics (M.E.) (T.A.M.)

ECPD Accreditation

The Engineer's Council for Professional Development (ECPD), a joint body concerned with the enhancement of the status of the engineer and the engineering profession, has been designated by its constituent bodies (American Society of Civil Engineers, American Institute of Mining, Metallurgical and Petroleum Engineers, American Society of Mechanical Engineers, Institute of Electrical and Electronics Engineers, American Society for Engineering Education, American Institute of Chemical Engineers, American Institute of Aeronautics and Astronautics, National Council of State Boards of Engineering Examiners, American Institute of Industrial Engineering, and the Engineering Institute of Canada) as the co-ordinating agency for the accrediting of undergraduate engineering curricula in the United States.

Undergraduate curricula of the College of Engineering are accredited by the ECPD and include: aerospace, agricultural, chemical, civil, electrical, industrial, and mechanical.

FACULTY

Chester A. Arents, P.E., M.E., (U. Ore.), *Dean of the College of Engineering.*
George W. Weaver, P.E., M.S.M.E. (WVU), *Assistant Dean of the College of Engineering.*

Engineering Experiment Station—Administration

Chester A. Arents, P.E., M.E. (U. Ore.), *Director.*
William R. Boyle, P.E., Ph.D. (WVU), *Assistant Director.*
Richard P. Smith, B.S.J. (WVU), *Assistant to the Director.*
Edward F. Byars, P.E., Ph.D. (U. Ill.), *Professor and Chairman of Mechanical Engineering and Mechanics.*
Walton W. Cannon, Ph.D. (U. Ill.), *Professor and Chairman of Electrical Engineering.*
Samy E. G. Elias, Ph.D. (Okla. St. U.), *Professor and Chairman of Industrial Engineering.*
Jerome B. Fanucci, Ph.D. (Penn. St. U.), *Professor and Chairman of Aerospace Engineering.*

Emory L. Kemp, P.E., Ph.D. (U. Ill.), *Professor and Chairman of Civil Engineering.*
Alfred D. Longhouse, P.E., Ph.D. (Cornell U.), *Professor and Chairman of Agricultural Engineering.*
Chin-Yung Wen, Ph.D. (WVU), *Professor and Chairman of Chemical Engineering.*

Aerospace Engineering

Jerome B. Fanucci, Ph.D. (Penn. St. U.), *Professor and Chairman of Aerospace Engineering.*
Jonathan M. Bennett, *Flight Instructor in Aerospace Engineering.*
Alvin D. Howell, Ph.D. (WVU), *Assistant Professor of Aerospace Engineering.*
John L. Loth, Ph.D. (U. Toronto), *Professor of Aerospace Engineering and Director of Propulsion Laboratory.*
Ellis E. Mood, *Flight Instructor in Aerospace Engineering.*
Nathan Ness, Ph.D. (Brooklyn Poly. Inst.), *Professor of Aerospace Engineering.*
Alvin W. Sheffler, M.S.A.E. (WVU), *Instructor in Aerospace Engineering.*
William Squire, M.A. (U. Buffalo), *Professor of Aerospace Engineering.*
Carmine Verna, M.S.A.E. (WVU), *Instructor in Aerospace Engineering.*
Richard E. Walters, Ph.D. (WVU), *Associate Professor of Aerospace Engineering and Director of Aerodynamics Laboratory.*
Syed Yusuff, Ph.D. (Brooklyn Poly. Inst.), *Professor of Aerospace Engineering.*

Agricultural Engineering

A. D. Longhouse, P.E., Ph.D. (Cornell U.), *Professor and Chairman of Agricultural Engineering.*
Waldo E. Bell, B.S.Ag.E. (Penn. St. U.), *Assistant Professor of Agricultural Engineering and State Extension Agricultural Engineering Specialist (Retired).*
Cleveland J. Biller, M.S.E. (WVU), *Lecturer in Forest Engineering.* (Research Mechanical Engineer, USDA, Forest Service, Forestry Sciences Laboratory, Morgantown.
Edmond B. Collins, M.S.Ag.E. (WVU), *Associate Professor of Agricultural Engineering and Chief of Party.* (Assigned to Egerton College, Njoro, Kenya, East Africa).
Walter H. Dickerson, P.E., M.S.Ag.E. (VPI), *Professor of Agricultural Engineering.*
Robert G. Diener, Ph.D. (Mich. St. U.), *Associate Professor of Agricultural Engineering.*
Kendall C. Elliott, M.S.Ag.E. (WVU), *Assistant Professor of Agricultural Engineering.*
Roy E. Emerson, M.S. (Cornell U.), *Associate Professor of Agricultural Engineering.*
Harry G. Gibson, M.S.E. (WVU), *Adjunct Assistant Professor of Agricultural Engineering.* (Project Leader, Forest Engineering Research, USDA, Forest Service, Forestry Sciences Laboratory, Morgantown).
Leonard R. Johnson, M.S. (Mont. St. U.), *Adjunct Assistant Professor of Forest Engineering,* (Research Industrial Engineer, USDA, Forest Service, Forestry Sciences Laboratory, Morgantown).
Ross A. Phillips, M.S.E. (WVU), *Adjunct Assistant Professor of Forest Engineering.* (Research Mechanical Engineer, USDA, Forest Service, Forestry Sciences Laboratory, Morgantown).
Arthur W. Selders, M.S.Ag.E. (U. Mass.), *Associate Professor of Agricultural Engineering and State Extension AgriculturalEngineering Specialist.*
Robert O. Weedfall, M.S.E. (WVU), *Adjunct Assistant Professor of Agricultural Engineering.* (Climatologist stationed with Department of Agricultural Engineering in cooperation with U.S. Weather Service).

Chemical Engineering

Chi-Yung Wen, Ph.D. (WVU), *Professor and Chairman of Chemical Engineering.*
Richard C. Bailie, Ph.D. (Iowa St. U.), *Professor of Chemical and Nuclear Engineering.*

George L. Blackshaw, Ph.D. (N.C. St. U.), *Associate Professor of Chemical and Nuclear Engineering.*
William R. Boyle, P.E., Ph.D. (WVU), *Professor of Chemical Engineering and Assistant Director of Engineering Experiment Station.*
Harold V. Fairbanks, P.E., M.S.Ch.E. (Mich. St. U.), *Professor of Metallurgical Engineering.*
Alfred F. Galli, P.E., M.S.Ch.E. (WVU), *Associate Professor of Chemical Engineering.*
Robert M. Hamilton, Ph.D. (Cornell U.), *Assistant Professor of Chemical Engineering.*
Joseph R. Henry, Ph.D. (U. Mich.), *Assistant Professor of Chemical Engineering.*
Sidney Katell, B.S. (NYU), *Adjunct Associate Professor (part-time) of Chemical Engineering.*
Walter A. Koehler, P.E., Ph.D. (U. Wisc.), *Professor and Director Emeritus.*
Duane G. Nichols, Ph.D. (U. Del.), *Assistant Professor of Chemical Engineering.*
Alfred W. Pappano, Ph.D. (WVU), *Assistant Professor of Chemical Engineering.*
John T. Sears, Ph.D. (Princeton U.), *Assistant Professor of Chemical and Nuclear Engineering.*

Civil Engineering

Emery L. Kemp, P.E., Ph.D. (U. Ill.), *Professor and Chairman of Civil Engineering.*
David A. Anderson, Ph.D. (Purdue U.), *Assistant Professor of Civil Engineering.*
Jerry C. Burchinal, P.E., M.S.C.E. (WVU), *Professor of Civil Engineering.*
Roland P. Davis, P.E., Ph.D. (Cornell U.), *Dean Emeritus, College of Engineering.*
James H. Davison, Ph.D. (U. Alberta), *Assistant Professor of Civil Engineering.*
William H. Fischer, Ph.D. (Rensselaer P.I.), *Lecturer in Environmental Engineering.*
Hota V.S. GangaRao, Ph.D. (N. C. St. U.), *Assistant Professor of Civil Engineering.*
Charles R. Jenkins, Ph.D. (Okla. St. U.), *Professor of Environmental Engineering.*
Lee Ellis King, Dr. Eng. (U. Calif.), *Associate Professor of Civil Engineering.*
Benjamin Linsky, P.E., M.S.E. (U. Mich.), *Professor of Environmental Engineering (Air Pollution).*
Larry D. Luttrell, P.E., Ph.D. (Cornell U.), *Associate Professor of Civil Engineering.*
Lyle K. Moulton, P.E., Ph.D. (WVU), *Associate Professor of Civil Engineering.*
Edward S. Neumann, Ph.D. (Northwestern U.), *Assistant Professor of Civil Engineering.*
William A. Sack, Ph.D. (Mich. St. U.), *Associate Professor of Civil Engineering.*
James W. Saunders, P.E., Ph.D. (WVU), *Lecturer in Civil Engineering.*
Roger K. Seals, Ph.D. (N. C. St. U.), *Associate Professor of Civil Engineering.*
William J. Wilhelm, Ph.D. (N. C. St. U.), *Associate Professor of Civil Engineering.*
Raul Zaltzman, P.E., M.S.C.E. (U. Okla.), *Associate Professor of Civil Engineering.*

Electrical Engineering

Walton W. Cannon, P.E., Ph.D. (U. Ill.), *Professor and Chairman of Electrical Engineering.*
M. Dayne Aldridge, D.Sc. (U. Va.), *Associate Professor of Electrical Engineering.*
Wilford D. Baker, Ph.D. (Carnegie-Mellon U.), *Assistant Professor of Electrical Engineering.*
Constantine A. Balanis, Ph.D. (Ohio St. U.), *Associate Professor of Electrical Engineering.*
Edwin C. Barbe, M.S.E.E. (WVU), *Assistant Professor of Electrical Engineering.*
Everette C. Dubbe, P.E., B.S.E.E. (S. Dak. St. C.), *Associate Professor of Electrical Engineering.*
H. L. Huang, Ph.D. (VPI), *Adjunct Assistant Professor of Electrical Engineering.*
Edwin C. Jones, P.E., M.S.E.E. (U. Ill.), *Professor Emeritus of Electrical Engineering.*
T. W. Keech, Jr., M.S.E.E. (WVU), *Instructor in Electrical Engineering.*
George H. Patton, M.S.E.E. (WVU), *Instructor in Electrical Engineering.*

Mason M. Peterson, P.E., B.S.E.E. (Ohio North. U.), *Associate Professor Emeritus of Electrical Engineering.*
Robert L. McConnell, M.Sc. (Ohio State U.), *Adjunct Assistant Professor of Electrical Engineering.*
Nelson S. Smith, Jr., P.E., D.Sc. (U. Pitt.), *Professor of Electrical Engineering.*
Eldon K. Stanek, P.E., Ph.D. (Ill. Tech.), *Assistant Professor of Electrical Engineering.*
Robert E. Swartwout, Ph.D. (U. Ill.), *Professor of Electrical Engineering.*
Subrahmanyam S. Venkata, Ph.D. (U. So. Car.), *Assistant Professor of Electrical Engineering.*
Richard W. Young, M.S.E.E. (WVU), *Instructor in Electrical Engineering.*

Industrial Engineering

Samy E. G. Elias, Ph.D. (Okla. St. U.), *Professor and Chairman of Industrial Engineering.*
Theodore C. Barker, B.S.I.E. (WVU), *Research Engineer in Industrial Engineering.*
Steven R. Borbash, Ph.D. (U. Pitt.), *Associate Professor of Industrial Engineering.*
Vergil B. Clark, M.S. (U. Tenn.), *Lecturer in Industrial Engineering, and Director, Physical Plant.*
Jack Byrd, Jr., Ph.D. (WVU), *Assistant Professor of Industrial Engineering.*
James O. Denny, M.L. (U. Pitt.), *Professor of Industrial Engineering.*
Robert D. Fowler, P.E., M.S.I.E. (Ga. Tech.), *Professor of Industrial Engineering.*
Donald L. Gochenour, Jr., Ph.D. (WVU), *Instructor in Industrial Engineering.*
Max L. Hailey, Ph.D. (Tex. Tech. U.), *Assistant Professor of Industrial Engineering.*
Arup K. Mallik, Ph.D. (N.C. St. U.), *Visiting Assistant Professor of Industrial Engineering.*
Ralph W. Plummer, Ph.D. (WVU), *Assistant Professor of Industrial Engineering.*
Cooper N. Redwine, Ph.D. (UCLA), *Assistant Professor of Industrial Engineering.*
Richard E. Ward, P.E., M.S.I.E. (WVU), *Research Engineer in Industrial Engineering.*

Mechanical Engineering and Mechanics

Edward F. Byars, P.E., Ph.D. (U. Ill.), *Professor and Chairman of Mechanical Engineering and Mechanics.*
Sunder H. Advani, Ph.D. (Stanford U.), *Associate Professor of Theoretical and Applied Mechanics.*
Richard A. Bajura, Ph.D. (U. Notre Dame), *Assistant Professor of Mechanical Engineering.*
Howard W. Butler, P.E., Ph.D. (Yale U.), *Professor of Mechanical Engineering.*
Carl H. Cather, P.E., M.S.M.E. (U. Ill.), *Professor Emeritus.*
Harold M. Cather, P.E., M.E., M.S.M.E. (WVU), *Professor Emeritus.*
Hasan T. Gencsoy, P.E., M.S.M.E. (WVU), *Professor of Mechanical Engineering.*
William A. Grissom, Ph.D. (U. Cincinnati), *Assistant Professor of Mechanical Engineering.*
Russell R. Haynes, P.E., Ph.D. (WVU), *Assistant Professor of Theoretical and Applied Mechanics.*
Gordon R. Hopkins, P.E., Ph.D. (U. Ala.), *Assistant Professor of Theoretical and Applied Mechanics.*
David E. McKee, P.E., Ph.D. (WVU), *Assistant Professor of Mechanical Engineering.*
Charles A. Moffatt, P.E., Ph.D. (Tulane U.), *Associate Professor of Theoretical and Applied Mechanics.*
In-Meei Neou, Ph.D. (Stanford U.), *Professor of Mechanical Engineering.*
Helen L. Plants, P.E., M.S.C.E. (WVU), *Professor of Theoretical and Applied Mechanics.*
Sidney H. Schwartz, Ph.D. (U. So. Calif.), *Associate Professor of Mechanical Engineering.*
Robert D. Slonneger, P.E., M.S.M.E. (U. Tex.), *Professor of Mechanical Engineering.*

J. Edward Sneckenberger, Ph.D., (WVU), *Assistant Professor of Mechanical Engineering.*
Robert D. Snyder, Ph.D. (WVU), *Professor of Theoretical and Applied Mechanics.*
Emil J. Steinhardt, Ph.D. (U. Pitt.), *Associate Professor of Mechanical Engineering.*
George W. Weaver, P.E., M.S.M.E. (WVU), *Professor of Theoretical and Applied Mechanics and Assistant Dean, College of Engineering.*
Donald T. Worrell, P.E., M.S.E. (WVU), *Professor of Theoretical and Applied Mechanics.*

Freshman Program

Charles E. Wales, P.E., Ph.D. (Purdue U.), *Professor of Engineering and Director of Freshman Program.*
Thomas R. Long, M.S.M.E. (WVU), *Assistant Professor of Engineering.*

REQUIREMENTS FOR DEGREES

Any student, to be eligible to receive a bachelor's degree in any branch of engineering for which degrees are offered, in addition to satisfying all entrance requirements, shall be required to complete satisfactorily the number of semester hours of work as specified in the curriculum of the department leading to the degree for which the student is a candidate, plus the general requirements of physical education and English proficiency by WVU for such a degree.

A grade of C or better must be attained in each mathematics course before registration in a subsequent mathematics course is allowed.

College of Engineering Curricula

The curricula are set up to give, in the first two years, a well-rounded training in the basic sciences of mathematics, chemistry, and physics, and in English. This is followed by such technical subjects as mechanics, thermodynamics, and electricity. The degree of emphasis varies somewhat with the curriculum followed. These courses bridge the gap between the pure sciences and the professional courses. In addition, courses in the humanities are given throughout the four years.

In the third and fourth years, special emphasis is placed on the professional work of the engineer. In these years a certain number of credit hours are available for electives.

The curricula lead to:

1. The degree of Bachelor of Science in Aerospace Engineering.
2. The degree of Bachelor of Science in Agricultural Engineering.
3. The degree of Bachelor of Science in Chemical Engineering.
4. The degree of Bachelor of Science in Civil Engineering.
5. The degree of Bachelor of Science in Electrical Engineering.
6. The degree of Bachelor of Science in Industrial Engineering.
7. The degree of Bachelor of Science in Mechanical Engineering.
8. Combined science and engineering curricula extending over five or more years leading to the degree of Bachelor of Science and Bachelor of Science in Engineering.

Curriculum in Aerospace Engineering

Degree: Bachelor of Science in Aerospace Engineering

Aerospace engineering embraces the science and technology of all vehicles not necessarily bound to the earth. This includes all types of aircraft, rockets, missiles, and spacecraft, whether flight takes place in the atmosphere, or beyond it.

The aerospace engineering curriculum includes the disciplines encountered in the design of all of these vehicles. The undergraduate student extensively studies the basic principles of fluid mechanics, structures, design, and experimentation, and thus becomes a versatile engineer upon graduation, competent to work in many areas of engineering. The curriculum may serve as a terminal program by incorporating design-oriented courses for the technical electives, or it may be used as a preparatory program for advanced study by the selection of science-oriented courses for these technical electives.

For those students who wish to pursue a career in medicine, dentistry, or related areas, but desire an aerospace engineering degree prior to entering the appropriate professional school, certain course substitutions may be made. These substitutions would include biology (8 hours) and organic chemistry (8 hours), to be substituted for 9 hours of technical electives and 3 hours of heat transfer. This selection will help the student satisfy admission requirements to the above-mentioned professional schools.

AEROSPACE ENGINEERING

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Math. 15	4	Math. 16	4
English 1	3	English 2	3
Engineering 1	3	Engineering 2	3
Chem. 15	4	Chem. 16	4
Phys. Ed. 1	1	Non-tech. elect.	3
		Phys. Ed. 2	1
	15		18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Math. 17	4	Math. 18	4
Physics 11	4	Physics 12	4
T.A.M. 51	4	T.A.M. 52	4
Speech Com. 11	3	A.E. 11	3
Non-tech. elect.	3	Non-tech elect.	3
	18		18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
A.E. 111	3	A.E. 112	4
A.E. 160	3	A.E. 140	3
M.E. 140	3	A.E. 161	3
E.E. 105	4	E.E. 160	4
Non-tech. elect.	3	Non-tech. elect.	3
	16		17

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
A.E. 100	Cr.	A.E. 120	3
A.E. 115	3	M.E. 152	3
A.E. 150	3	Technical elect.	6
A.E. 165	2	Non-tech. elect.	3
Math. elect.	3		
Technical elect.	3		
Non-tech. elect.	3		
	17		15

Non-technical elective core curriculum courses must consist of 9 hr. of Group A and 12 hr. of Group B, and at least two subjects in each group; 18 hr. must be core courses on the College of Engineering-approved list.

Two technical electives must be selected from aerospace engineering courses in the 200 or 300 series.

Curriculum in Agricultural Engineering

Degree: Bachelor of Science in Agricultural Engineering

Agricultural engineering is the application of engineering principles to agriculture. Success in the application of engineering fundamentals to the agricultural industry requires knowledge of both the biological and physical sciences. The purpose of the course is to give the student general training in agricultural and engineering fundamentals. Considerable stress is given to basic requirements of plant and animal life which affect engineering practices, but greater emphasis is placed on a thorough knowledge of those underlying principles and methods which are the foundation of all the engineering professions.

Although the curriculum gives limited opportunity for specialization, agricultural engineering is made up of five major fields. These are: power and machinery, structures and environment, soil and water conservation, electric power and pocessing, and food engineering.

AGRICULTURAL ENGINEERING

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4	Biol. 1	4	Agron. 2	4
Engineering 1	3	Engineering 2	3	Math. 17	4	Math. 18	4
English 1	3	English 2	3	Physics 11	4	Physics 12	4
Math. 15	4	Math. 16	4	T.A.M. 51	4	T.A.M. 52	4
Phys. Ed. 1	1	Phys. Ed. 2	1	Non-tech. elect.	3	Non-tech. elect.	3
		Non-tech. elect.	3				
	15		18		19		19

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Econ. 51	3	Ag.E. 201	3	Ag.E. 230 or 260	3	Ag.E. 210 or 220	3
E.E. 105	4	Econ. 52	3	Ag.E. 240 or 250	3	Ag.E. 290	3
M.E. 10	3	C.E. 115	3	Ag. Sci. elect.	3	Non-tech. elect.	3
M.E. 101	3	M.E. 112	3	Non-tech. elect.	3	Technical elect.	6
Math. elect.	3	Non-tech. elect.	3	Technical elect.	3		
		C.E. 1	2				
	16		17		15		15

Forest Engineering Option

Forest engineering is an option curriculum in agricultural engineering leading to the Bachelor of Science in Agricultural Engineering. This option is intended primarily to prepare engineers for forest production and harvesting industries and for research and development with industries manufacturing forest machinery and equipment. Forest engineering embraces recognition and solution of engineering problems associated with producing, harvesting, handling, and transporting primary forest products to the mill.

The curriculum includes courses in the biological and forestry sciences which enable the student to appreciate and understand the nature of the

engineering problems in the forest industries. The curriculum provides some opportunity for specialization. Students interested in employment with companies manufacturing machinery and equipment for the forest industries should emphasize machine design and development. Students desiring employment with forest industries producing and harvesting logs and pulpwood should select elective courses in materials handling and related subjects. The curriculum permits graduates to select from a wide variety of employment opportunities. It contains sufficient depth in certain areas to prepare the student to pursue graduate training for an advanced degree. Industries and government agencies are placing increased emphasis on graduate-level training. Students who have an interest in engineering teaching and/or research should plan to continue their education at the graduate level.

FOREST ENGINEERING

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
English 1	3	English 2	3
Chem. 15	4	Chem. 16	4
Math. 15	4	Math. 16	4
Engineering 1	3	Engineering 2	3
Phys. Ed. 1	1	Phys. Ed. 2	1
		Non-tech. elect.	3
	15		18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	F.M. 122	3
Physics 11	4	Physics 12	4
Math. 17	4	Math. 18	4
T.A.M. 51	4	T.A.M. 52	4
Non-tech. elect.	3	Non-tech. elect.	3
	19		18

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
M.E. 10	3	F.M. 12	3
M.E. 101	3	C.E. 115	3
Biol. 51	2	M.E. 112	3
E.E. 105	4	W.S. 130	3
Econ. 51	3	Econ. 52	3
Non-tech. elect.	3	Technical elect.	3
	18		18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
C.E. 1	2	F.M. 230	3
F.M. 211	4	Math. elect.	3
F.M. 233	4	Non-tech. elect.	3
Non-tech. elect.	3	Technical elect.	3
M.E. 134	3	Ag.Eng. or For. Eng. elect.	3
Ag.Eng. or For. Eng. elect.	3		
	19		15

Technical electives must be upper-division engineering courses including agricultural engineering and forest engineering. An exception is For. 226.

Curriculum in Chemical Engineering

Degree: Bachelor of Science in Chemical Engineering

The curriculum in chemical engineering has been developed to qualify graduates for positions in operation, development, design, construction, and management of manufacturing plants in which raw materials are subjected to chemical and physical changes to produce economically desirable products.

The first two years include English, basic mathematics through differential equations, chemistry, classical physics, and elementary mechanics. Courses in the humanities introduce the social-humanistic stem which continues throughout the remainder of the curriculum.

The third year includes organic chemistry and engineering sciences comprising chemical engineering fundamentals of momentum, mass and heat transfer, thermodynamics and reaction kinetics.

The fourth-year senior block introduces the student to the actual practice of chemical engineering including analysis, synthesis and design centered around a comprehensive plant design project, process dynamics, design of experiments, nature of materials, and professional practice and ethics. Associated with this block is a written and oral communications sequence. Sequences in the humanistic-social and technical electives continue in the senior year.

CHEMICAL ENGINEERING

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Math. 15	4	Math. 16	4	Math. 17	4	Math. 18	4
English 1	3	English 2	3	Physics 11	4	Physics 12	4
Engineering 1	3	Engineering 2	3	T.A.M. 51	4	T.A.M. 52	4
Chem. 15	4	Chem. 16	4	Non-tech. elect.	3	Non-tech. elect.	3
Phys. Ed. 1	1	Phys. Ed. 2	1	Ch.E. 40	2	Ch.E. 41	2
		Non-tech. elect.	3				
	15		18		17		17

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 133	3	Chem. 134	3	Chem. 143	3	Chem. 144	3
Chem. 135	1	Chem. 136	1	Elective	3	Elective	3
Electives	9	Electives	9	Senior Block			
Junior Block				Ch.E. 170	10	Ch.E. 171	10
Ch.E. 110	3	Ch.E. 111	3				
Ch.E. 142	3	Ch.E. 143	3				
	19		19		16		16

Electives in the junior and senior years must be selected to complete requirements of non-technical electives (24 hr.), technical electives (6 hr.) and a Math. elective or Ch.E. 231 (3 hr.).

A 2.0 grade-point average in required chemical engineering courses is necessary before a student can register in Ch.E. 170 or 171.

Curriculum in Civil Engineering

Degree: Bachelor of Science in Civil Engineering

In addition to those general and scientific subjects which form a sound foundation for any engineering career, this curriculum provides the basic training for the civil engineer. Since this field is too broad to be covered thoroughly in a four-year course, emphasis is on fundamentals. However, some specialization is available through electives in advanced courses in transportation, sanitary engineering, structures, soil mechanics, or photogrammetry and surveying, which are available in civil engineering or related departments.

A cooperative program with the State Department of Highways provides an opportunity for eligible students to combine formal education with practical experience.

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Math. 15	4	Math. 16	4
English 1	3	English 2	3
Engineering 1	3	Engineering 2	3
Chem. 15	4	Chem. 16	4
Phys. Ed. 1	1	Phys. Ed. 2	1
		Non-tech. elect.	3
	15		18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Math. 17	4	Math. 18	4
Physics 11	4	Physics 12	4
T.A.M. 51	4	T.A.M. 52	4
Geol. 1	3	Non-tech. elect.	3
Non-tech elect.	3	C.E. 90	1
	18		16

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
C.E. 101	4	C.E. 120	4
C.E. 110	4	C.E. 147	3
C.E. 160	3	C.E. 169	3
C.E. 195	CR	C.E. 180	4
Econ. 52	3	C.E. 195	CR
I.E. 277	3	Eng. Sci. elect.	3
	17		17

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
C.E. 131	4	Tech. elect.	3
C.E. 146	3	C.E. 195	CR
C.E. 195	CR	C.E. 291	3
C.E. 260	3	Eng. Sci. elect.	3
Non-tech. elect.	3	Non-tech. elect.	9
Tech. elect.	3		
	16		18

Non-technical electives must be selected to meet University Core Curriculum requirements and College of Engineering humanistic course requirements.

Technical electives must be approved by the Department of Civil Engineering and may be selected from the basic sciences, engineering science or engineering analysis area.

Engineering science electives are to be selected from: A.E. 111; Ag.E. 240; E.E. 105; M.E. 222; and either M.E. 101 or 140.

Curriculum in Electrical Engineering

Degree: Bachelor of Science in Electrical Engineering

The course in electrical engineering has been developed to give the student general training in engineering fundamentals and broad training in the field of electrical engineering. Special training is available in the following fields as electives in the senior year: electric power, communications, control, solid state electronics, microwaves, antennas, and computing systems.

In the first two years of electrical engineering, the work is limited for the most part to those subjects which are essential as preparatory courses for the more technical courses in the third and fourth years. During the second year, fundamental courses in electrical engineering are introduced. A course in modern physics is included. In the third and fourth years the curriculum is mainly courses in electrical engineering and electives.

The technical electives are scheduled in the curriculum to permit a student to acquire more depth in his preferred area of electrical engineering. Thus, electives normally will be selected from 200-level electrical engineering courses. However, the student's adviser may recommend, in some cases, that a student select technical electives from upper-level courses in mathematics, the sciences, or other areas of engineering as a part of his curriculum. Mathematics electives and engineering science electives are to be selected from department-approved lists.

Students enrolled in the Department of Electrical Engineering will not be allowed to register in any electrical engineering course unless they have obtained a grade of C or better in all its prerequisite electrical engineering courses.

To be eligible for graduation, a student enrolled in the Department of Electrical Engineering must attain a passing grade in all electrical engineering courses for which he has registered except for courses with a grade of W.

ELECTRICAL ENGINEERING

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4	E.E. 20	3	E.E. 23	3
Engineering 1	3	Engineering 2	3	Math. 17	4	Math. 18	4
English 1	3	English 2	3	Physics 11	4	Physics 12	4
Math. 15	4	Math. 16	4	T.A.M. 51	4	T.A.M. 52	4
Phys. Ed. 1	1	Non-tech. elect.	3	Non-tech. elect.	3	Non-tech. elect.	3
		Phys. Ed. 2	1				
	15		18		18		18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
E.E. 125	4	E.E. 126	3	E.E. 131	3	E.E. 218	3
E.E. 140	3	E.E. 130	3	E.E. 154	4	Eng'g. Sci. elect.	3
E.E. 150	3	E.E. 141	3	E.E. 200	0	Non-tech. elect.	6
Econ. 51	3	E.E. 152	4	Non-tech. elect.	3	Tech. elect.	6
Math. or Stat. elect.	3	Econ. 52	3	Tech. elect.	6		
	16		16		16		18

Curriculum in Industrial Engineering

Degree: Bachelor of Science in Industrial Engineering

Industrial Engineering began in the latter part of the nineteenth century through the efforts of such pioneers as Frederick Taylor and Frank and Lillian Gilbreth. The Gilbreths are best known as leading figures in the book and movie entitled *Cheaper by the Dozen*. These early industrial engineers were concerned with improving the effectiveness of manual industrial operations. They made remarkable savings possible through the use of motion and time studies and methods analysis. As industries became more complex large scale systems, industrial engineers became concerned with additional areas of concern to management. Industrial engineers became involved in the design of production facilities using plant layout procedures. They also were developing quality control plans which are so important today in providing for consumer protection in product purchases. As production processes became more complex, the industrial engineer became involved in examining the range of manufacturing processes necessary to produce a product and how these can be utilized most effectively. In the late fifties and the early sixties, the computer became a powerful new tool for use in solving management problems. Once the computer became economical, the industrial engineer became involved in

using the computer to solve larger and more complex management problems through the use of such modern management science tools as operations research.

Today's industrial engineering students still learn the fundamental principles which were developed years ago; however, the industrial engineering student in the 1970's is increasingly more concerned with using the computer to solve industrial and social problems. At the same time, the industrial engineer has become even more involved with the human element of organization. The industrial engineering area known as human factors is concerned with the individual's health, safety, limitations, and capabilities as these relate to his job and the working environment.

The industrial engineer graduating today has a versatile degree which can be used in every endeavor in our society. Since the industrial engineer is involved in the more effective management of organizations, he is not limited to any one industry. The industrial engineer is not even restricted to industry and many industrial engineers have found employment in such places as hospitals, farms, banks, retail stores, and virtually every government agency.

The industrial engineer is frequently promoted to top management positions. Industry has found that their managers must have a knowledge of both technical and management problems. The industrial engineer has an excellent blending of these two fields: technology and management. For this reason, the top management of many of our largest organizations are industrial engineers.

INDUSTRIAL ENGINEERING

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Math. 15	4	Math. 16	4	Math. 17	4	Math. 18	4
English 1	3	English 2	3	Physics 11	4	Physics 12	4
Engineering 1	3	Engineering 2	3	T.A.M. 51	4	T.A.M. 52	4
Chem. 15	4	Chem. 16	4	Non-tech. elect.	3	I.E. 140	3
Phys. Ed. 1	1	Non-tech. elect.	3	I.E. 20	3	Non-tech. elect.	3
		Phys. Ed. 2	1				
	15		18		18		18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Econ. 51	3	Econ. 52	3	I.E. 250	3	M.E. 101	3
I.E. 213	3	E.E. 106	4	I.E 277	3	I.E. 142	3
E.E. 105	4	I.E. 100	3	I.E. tech. elect.	6	I.E. tech. elect.	3
E.E. 281	3	I.E. 170	3	Non-tech. elect.	3	Non-tech. elect.	3
Non-tech. elect.	3	I.E. 214	3	Ch.E. 105	3	C.E. 115	3
	16		16		18		15

Non-technical electives must satisfy requirements for both Group A and B, Core Curriculum requirements.

Curriculum in Mechanical Engineering

Degree: Bachelor of Science in Mechanical Engineering

Mechanical Engineering is a profession in which its members work creatively to achieve practical results in terms of products and services that people need or want. In view of the wide range of products and services encompassed by mechanical engineering, it is not surprising that mechanical engineers find employment in a wide range of industries, as well as governmental agencies and educational institutions. It is thus very important that the mechanical engineering curriculum prepare students to deal effectively with a broad range of engineering problems, rather than narrow specialities.

Mechanical engineers, while strongly oriented toward science, are not scientists. They must deal with reality in all its aspects and must be competent to use classical as well as the most modern parts of science together with empirical knowledge and ingenuity to effectively practice their profession. The ability to make acceptable compromises between the often conflicting demands of scientific rigor and economic necessity, deadlines and perfection, high efficiency and reliability, requires the maturity of a highly educated mind. The curriculum in mechanical engineering is designed to prepare students to this end and may be conveniently divided into four main parts, including courses in (a) mathematics, chemistry, physics, and English, which form the founda-

MECHANICAL ENGINEERING

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4	Math. 17	4	Math. 18	4
Engineering 1	3	Engineering 2	3	Physics 11	4	Physics 12	4
English 1	3	English 2	3	T.A.M. 51	4	T.A.M. 52	4
Math. 15	4	Math. 16	4	Core	3	Core	6
Phys. Ed. 1	1	Phys. Ed. 2	1	M.E. 294	2		
		Core	3				
	15		18		17		18

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
E.E. 105	4	E.E. 106	4	M.E. 134	3	M.E. 136	3
M.E. 10	3	M.E. 112	3	M.E. 152	3	Core	3
M.E. 140	3	M.E. 141	3	M.E. 182	2	Core	3
M.E. 170	3	M.E. 144	3	Core	6	Prof. elect.	6
Ch.E. 105	3	M.E. 180	3	Prof. elect.	3		
	16		16		17		15

The professional electives (9 hours) are selected by the student with the advice and approval of the adviser. The courses selected should form a clear and consistent pattern according to the career objectives of the student. Six of the professional elective credits must be selected from courses in the department.

The 24 credit hours of core must be selected from the WVU Core Curriculum with the approval of the adviser: Core A, 12 hours and Core B, 12 hours.

All students in mechanical engineering will be required to pass an examination on manufacturing processes and machine tools prior to commencing the fourth year of studies. Information on the content and nature of this examination may be obtained from the student's adviser.

tion of all engineering activity, (b) humanities and liberal studies which help to develop consciousness and a sense of proportion, (c) the engineering sciences which extend the basic sciences to practical levels, (d) professional engineering subjects which emphasize the professional approach to project engineering rather than the acquisition of specialized knowledge or skills.

While the undergraduate curriculum is sufficiently broad to permit the graduate to select from a wide variety of employment opportunities, at the same time it contains sufficient depth to prepare a student to enter graduate school to seek an advanced degree. As modern science and engineering become ever more complex, the desirability of graduate levels of preparation is being recognized by most advanced industries and government agencies. Students who develop an interest in engineering research or in academic teaching should plan to continue their education through the M.S. or Ph.D. level.

Five-Year Curricula

Degree: Bachelor of Science in conjunction with a degree in engineering

These curricula are designed to meet the needs of students who wish to receive a broader training than is provided in the four-year program. They also enable the student to take lighter schedules than are required in the four-year curricula.

(A) Requirements for the degree of Bachelor of Science, to be conferred at the end of the fourth year, where the student's grade-point average is 2.5 or over, or at the time of the conferring of the engineering degree where the grade-point average is below 2.5.

(1) The requirements of the first three years of any four-year engineering curriculum.

(2) a. Twelve semester hours of one foreign language, where no secondary school entrance credits have been allowed or

b. Six semester hours at intermediate level, where two units of entrance credits have been allowed in the same foreign language.

(3) Electives from the following groups, amounting to 6 semester hours where (2a) applies and 12 semester hours where (2b) applies.

a. Not more than 3 hours each of English, history and speech communication.

b. Not more than 6 hours each in any one or more than the following groups: foreign languages (other than specified above); journalism; business and economics, political science; and philosophy, psychology, and sociology.

(B) Requirements for the Bachelor of Science degree in engineering to be conferred on completion of the work of the fifth year.

Special Engineering Curricula

Elective Groups for Students in Other Colleges

Candidates for degrees other than engineering degrees, and special students in any department of WVU, are permitted to elect subjects in the College of Engineering, provided, in each case, they have had the subjects specified as prerequisites. Students who wish to take a general classical or scientific

course of study before taking the engineering curriculum are advised to carry their mathematics as far as called for by the engineering curriculum, and to take some elective work in the College of Engineering.

Partial Curriculum

Students who do not have the time or are otherwise unable to take the full curriculum will be allowed to take a special or partial curriculum, consisting of such studies as they are prepared to take, provided such curriculum shall have been approved by the adviser.

Professional Degrees

Aerospace Engineer (A.E.), Chemical Engineer (Ch.E.), Civil Engineer (C.E.), Electrical Engineer (E.E.), Mechanical Engineer (M.E.).

The professional degree is conferred by the College of Engineering on the basis of practical experience and study in absentia, the presentation of a thesis, and oral final examination. To be eligible, a candidate for a professional degree must have been in active practice of his profession for at least five years since receiving his first degree, and must have been in responsible charge of important work for at least two years. Application for registration as a candidate for a professional degree should be made not later than October 1 in the academic year in which the degree is desired. Regulations and registration forms may be obtained from the Dean of the College of Engineering.

COURSES OF INSTRUCTION IN ENGINEERING

Freshman Program

E.

1. **Freshman Engineering Design.** 3 hr. Introduction to the concepts of design (analysis, synthesis and evaluation), report writing, conservation of mass, conservation of energy, graphical communication, and calculation techniques. 2 hr. rec., 4 hr. lab.

2. **Freshman Engineering Design.** 3 hr. A continuation of the work begun in Engineering 1, with extension of the concepts to new design problems. 2 hr. rec., 4 hr. lab.

General Engineering

E.

111.* **The Impact of Technology on Society.** 3 hr. Designed for non-technical students to give insight into the social relevance of technology and engineering in today's culture, this course deals with the broad interface of technology with modern society, with life essentials, communication, manufacturing, etc. Attitudes of scientists, engineers, and others compared.

325. **Ordinary Differential Equations in Engineering Analysis.** I. 3 hr. PR: Consent. Solution techniques for linear and non-linear ordinary differential equations in application to engineering problems. Emphasis is on approximate and numerical methods including digital computer techniques. Iterative asymptotic and weighted-residual methods; the numerical solution of ordinary differential equations in engineering analysis.

Aerospace Engineering

A.E.

11. **Introduction to Flight Vehicles.** 3 hr. PR: Math. 17, T.A.M. 51. Introduction to the use of computer methods for engineering calculation. Application to the determination of basic performance parameters of aircraft performance such as range, ceiling, and take-off run. 2 hr. lec., 3 hr. lab.

100. **Inspection Trip.** (Credit). PR: Senior standing.

111.° **Fluid Dynamics I.** 3 hr. Coreq: Math. 18. Properties of the fluid medium, dimensional analysis, hydrostatics, kinematics and dynamics of a fluid field, perfect fluid flow about a body, complex potential function, thin airfoil theory, conformal transformation. 3 hr. lec.

112.° **Fluid Dynamics II.** 4 hr. PR: A.E. 111, M.E. 140. Finite wing theory. Introduction to compressible, nonviscous fluids, isentropic flow, Prandtl-Meyer expansion, shock waves, airfoils in compressible flow, small perturbation theory, viscous effects. 4 hr. lec.

115. **Experimental Fluid Dynamics I.** 3 hr. PR: A.E. 112. Subsonic and supersonic wind tunnel testing methods and practice. Experiments include the following measurements: pressure distribution on bodies, boundary layer determination, turbulence measurements, force tests, and stability and performance determinations. Corrections for scale and jet boundary effects. Test design, data analysis, and engineering report preparation. 3 hr. lec., 2 hr. lab.

120. **Flight Vehicle Design.** 3 hr. PR: A.E. 140. Preliminary design of flight vehicles. Vehicles are designed with regard for performance and stability requirements, considering aerodynamics, weight and balance, structure arrangement, configuration, guidance, and propulsion effects. Layout drawings and calculations are combined in a preliminary design report. 1 hr. lec., 6 hr. lab.

140. **Flight Mechanics.** 3 hr. PR: A.E. 111. Fundamental concepts of aircraft static and dynamic stability and control. Derivation of general equations of unsteady aircraft motion. Use of aerodynamic transfer functions and automatic control systems are introduced. 3 hr. lec.

150. **Flight Vehicle Propulsion.** 3 hr. PR: A.E. 112 or consent. Equilibrium combustion thermodynamics. Quasi one-dimensional flow with friction and total temperature change. Thermodynamics of aircraft engines. Aerodynamics of inlets, combustors, nozzles, compressors and turbines. Performance of rockets. Ideal rocket analysis. 3 hr. lec.

160. **Flight Vehicle Structures I.** 3 hr. PR: T.A.M. 52. Strength of thin walled structures in bending, shear, and torsion. Strain energy and application of Castigliano's theorem to bending of rings and curved bars, and to analysis of frames. Principle of virtual work and its application to beam and truss deflections and to statically indeterminate structures. 3 hr. lec.

161. **Flight Vehicle Structures II.** 3 hr. PR: A.E. 160. Tension fields and the design of Wagner beam. Buckling of compression structures: bars, sandwich columns, wrinkling in sandwich construction, plates, shells and stiffened panels. Design

°May be taken as undergraduate work by students in other colleges and schools.

for minimum weight. Introduction to matrix methods of structural analysis. Failure by fatigue and fracture. 3 hr. lec.

165. **Experimental Flight Vehicle Structures.** 2 hr. PR: A.E. 160. Tension properties and stress-strain curves of materials. Strain gage circuitry. Elastic and inelastic column buckling testing and theoretical comparison. Structural dynamics testing of vibrating beams. Shear tests by torsion, and torsion of thin-walled members. Observation of photoelastic and Moire fringe pattern techniques, and an introduction to fatigue testing. 1 hr. lec., 3 hr. lab.

215. **Experimental Fluid Dynamics II.** 3 hr. PR: A.E. 115. Continuation of A.E. 115 with increased emphasis on dynamic measurements. Shock tube/tunnel and subsonic and supersonic measurements. Experiments include optical techniques, heat transfer to models, and viscous flow measurements. Error analysis of test data. 2 hr. lec., 3 hr. lab.

216. **Applied Aerodynamics.** 3 hr. PR: A.E. 140. Chordwise and spanwise airload distribution for plain wings, wings with aerodynamic and geometric twist, wings with deflected flaps, and wings with ailerons deflected. Section induced drag characteristics. 3 hr. lec.

220. **Guided Missile Systems.** 3 hr. PR: A.E. 112 and/or conc: A.E. 150. Design philosophy according to mission requirements. Preliminary configuration and design concepts. Aerodynamic effects on missiles during launch and flight. Ballistic missile trajectories. Stability determination by analog simulation. Performance determination by digital and analog simulation. Control, guidance, and propulsion systems. Operational and reliability considerations. 3 hr. lec.

232. **V/STOL Aerodynamics.** 3 hr. PR: A.E. 112. An introductory course presenting the fundamental aerodynamics of V/STOL aircraft. The topics covered include propeller and rotor theory, helicopter performance, jet flaps, ducted fans, and propeller-wing combinations. 3 hr. lec.

234. **Fluid Dynamics III.** 3 hr. PR: A.E. 112. Fundamentals of viscous flow and introduction of the Navier-Stokes equation; incompressible laminar flow in tubes and boundary layers; transition from laminar to turbulent flow; incompressible turbulent flow in tubes and boundary layers. 3 hr. lec.

235. **Fluid Dynamics IV.** 3 hr. PR: A.E. 112. One-dimensional non-steady gasdynamics. Shock tube theory and applications. Fundamentals of supersonic and hypersonic flow and the determination of minimum drag bodies. 3 hr. lec.

242. **Flight Testing.** 3 hr. PR: A.E. 140. Applied flight test techniques and instrumentation, calibration methods, determination of static performance characteristics, and introduction to stability and control testing based on flight test of Cessna Super Skywagon airplane. Flight test data analysis and report preparation. 1 hr. lec., 6 hr. lab.

249.* **Space Mechanics.** 3 hr. PR: Math. 18, T.A.M. 51. An introduction of flight in and beyond the earth's atmosphere by space vehicles. The laws of Kepler and Orbital theory. Energy requirements for satellite and interplanetary travel. Exit from and entry into an atmosphere. 3 hr. rec.

250. **Advanced Topics in Propulsion.** 3 hr. PR: A.E. 150 or consent. Special problems of thermodynamics and dynamics of aircraft power plants. Chemical

rocket propellents and combustion. Rocket thrust chambers and nozzle heat transfer. Nuclear rockets. Electrical rocket propulsion. 3 hr. lec.

260. **Design of Flight Structures I.** 3 hr. PR: A.E. 161. Structural design and analysis of flight vehicle members. Layout and detail design of specified components are required. 1 hr. lec., 6 hr. lab.

265. **Aeroelasticity.** 3 hr. PR: A.E. 160. The study of vibrating systems of single degree and multiple degrees of freedom, flutter theory and modes of vibration, torsional divergence and control reversal. 3 hr. lec.

280. **Aerospace Problems.** 1-6 hr. Upper division and graduate.

285. **Thesis.** 2-6 hr. PR: Senior standing and consent.

291. **Introduction to Research.** 1-3 hr. PR: Senior standing and consent. An introduction to the methods of organizing theoretical and experimental research. Formulation of problems, project planning, and research proposal preparation.

292. **Research Problems.** 2-6 hr. PR: A.E. 291 or consent. Performance of the research project as proposed in A.E. 291. Project results are given in written technical reports, with conclusions and recommendations.

300. **Seminar.** Credit. Attendance required of all graduate students at scheduled aerospace engineering seminars.

315. **Fluid Flow Measurement.** 3 hr. PR: A.E. 112 or consent. The principles and measurements of static and dynamic pressures and temperatures, velocity and Mach number and forces. Optical techniques and photography. Design of experiments. Review of selected papers from the literature. 2 hr. lec., 3 hr lab.

380. **Special Problems.** 2-4 hr. PR: Consent of department chairman. A course for graduate students in the non-research program. The student will select a specialized field and follow a course of study in that field under the supervision of a counselor.

Agricultural Engineering

Ag.E.

201. **Agricultural Structures.** 3 hr. PR: T.A.M. 52. Structural design and functional requirements of agricultural buildings. 2 hr. rec., 3 hr. lab.

210. **Application of Electricity to Agriculture.** 3 hr. PR: E.E. 105. Economic application of electric light, heat, and power. 2 hr. rec., 3 hr. lab.

220. **Agricultural Process Engineering.** 3 hr. PR: C.E. 115, M.E. 101. Application of the fundamentals of engineering to agricultural engineering processes. 2 hr. rec., 1 hr. lab.

230. **Farm Power.** 3 hr. PR: M.E. 101. Fundamental theories underlying design and operation of internal combustion engines used in agriculture. 3 hr. rec., 3 hr. lab.

240. **Hydrology.** 3 hr. PR: C.E. 115. The study of a hydrology cycle with emphasis on precipitation and runoff as related to design of hydraulic structures, soil and water conservation, and flood control. 3 hr. rec.

250. **Soil and Water Conservation.** 3 hr. PR: C.E. 115. Engineering principles and practices in conservation, utilization, and management of soil and water resources. 2 hr. rec., 3 hr. lab.

260. **Properties of Biological and Animal Materials.** 3 hr. PR: Biol. 1, T.A.M. 102, or consent. Study of physical properties of biological materials as related to harvesting, handling and transporting, conditioning, preserving and storing operations. 2 hr. rec., 3 hr. lab.

280. **Agricultural Engineering Problems.** 1-3 hr. PR: Consent. Special problems relating to Agricultural Engineering; primarily for seniors.

290. **Elements of Machinery Design.** 3 hr. PR: M.E. 101. Design requirements for construction, principles of operation and adequate adjustment of agricultural machines and principles of testing agricultural equipment. 2 hr. rec., 3 hr. lab.

300. **Seminar.** 1 hr. Senior or graduate standing.

340. **Problems in Hydrology.** 3 hr. PR: Ag.E. 240. Consideration of special problems in hydrograph analysis, hydrologic performance of small watersheds, erosion and sedimentation, hydro-meteorological studies, flood runoff and peak discharge, drought, river forecasting, frequency analysis of hydrologic data. Special report. 3 hr. rec.

341. **Physical Climatology.** 3 hr. PR: Consent. Physical principles underlying the variations and changes in climate, climatic controls, elements of microclimatology, engineering applications and uses of climatic data. 3 hr. rec.

Forest Engineering

For. Eng'g.

300. **Seminar.** 1 hr. Current discussion of research in forest engineering and special report.

391. **Logging Systems Engineering.** 3 hr. PR: Math. 18 or consent. Theory and design of modern forest harvesting systems such as balloon logging, cableways, pipelines and conveyors. Design features of specialized forest harvesting machines and devices. Systems engineering approach to equipment utilization. 3 rec.

392. **Hydraulic Power.** 3 hr. PR: Math. 18 or consent. Includes characteristics of hydraulic control components, hydraulic fluid characteristics, materials in hydraulic circuits, components and elements for circuit design, the feedback control approach, derivation of component transfer functions, measuring control dynamic characteristics, computer simulation techniques, hydraulic control circuits and hydraulic design practice. 3 rec.

Chemical Engineering

Ch.E.

40. **Chemical Engineering Calculation I.** 2 hr. PR: Math. 15, Chem. 16, E. 2. Introduction to chemical engineering fundamentals and calculation procedures, industrial stoichiometry, real gases and vapor-liquid equilibria, heat capacities and enthalpies, material balances and energy balances. 2 hr. rec.

41. **Chemical Engineering Calculations II.** 2 hr. Continuation of Ch.E. 40. 2 hr. rec.

105. **Engineering Materials Science.** 3 hr. PR: Physics 12. Includes a study of the internal structures of metals, ceramics, and organic materials, and the dependence of properties upon these structures. Also, the behavior of materials under conditions involving mechanical stresses, thermal reactions, corrosion, electromagnetic fields and radiation. 3 hr. rec.

110. **Chemical Engineering Fundamentals.** 3 hr. PR: Math. 17, Ch.E. 41. Phase diagrams. Equilibrium stage calculations including counter-current multistage operations with reflux. Introduction to fluid flow, heat transfer and mass transfer. Shell and macroscopic balances for transfer rate processes. Applications including computer techniques. Laboratory demonstrations. 3 hr. rec.

111. **Chemical Engineering Fundamentals.** 3 hr. Continuation of Ch.E. 110. 3 hr. rec.

142. **Chemical Engineering Thermodynamics and Kinetics.** 3 hr. PR: Ch.E. 41. First and second law of thermodynamics. Real material thermodynamic functions. Physical and chemical reactions, catalytic reactions. Influence of transport phenomena on reaction rate. Chemical reactors. 3 hr. rec.

143. **Chemical Engineering Thermodynamics and Kinetics.** 3 hr. Continuation of Ch.E. 142. 3 hr. rec.

170, 171. **Chemical Engineering Professional Block.** 1-10 hr. ea. PR: Completion of all technical courses prescribed for the first three years. Professional aspects of chemical engineering involving analysis, synthesis and design, process dynamics, design of experiments, materials, engineering design and computation laboratories, and seminar on engineering practice and ethics. Includes a comprehensive plant design project.

197. **Thesis.** 2-5 hr. Open only to qualified seniors. A problems in chemical engineering or industrial chemistry is selected for investigation. A carefully prepared report is required. 6-15 hr. lab.

210. **Process Engineering.** 3 hr. PR: Ch.E. 111. Process equipment calculation for unsteady state. Determination of maximum and minimum process conditions. Economics of processing methods.

224. **Process Development.** 3 hr. PR: Chem. 134, 144, Ch.E. 111 and 143. Development of process systems from the modified unit operations-unit process concept. Use of thermodynamics and kinetics in the evaluation of system requirements and performance. 3 hr. rec.

231. **Mathematical Methods in Chemical Engineering.** 3 hr. PR: Math. 18. The classification and solution of mathematical problems important in chemical engineering. Treatment and interpretation of engineering data. Functions of several variables. Analytical methods for ordinary and partial differential equations including orthogonal functions and integral transforms. 3 hr. rec.

238. **Design and Analysis of Experiments.** 3 hr. PR: Consent. Development and quantitative relationships of a system as a whole; the interpretation of these relationships through response surface analysis, factorial composite and screening designs, evolutionary operations; optimum conditions, and case histories. 3 hr. rec.

251. **Metallurgical Engineering.** 3 hr. PR: Physics 12. Includes principles of production of metals and alloys, plastic deformation of metals, corrosion and metal failure. 3 hr. rec.

253. **Ceramic Engineering I.** 3 hr. PR: Physics 12. Characterization of ceramic systems. Includes the study of internal structure and structure sensitive properties, liquid and solid solutions: rheology: mechanical, thermal, chemical, optical, and electrical properties. 3 hr. rec.

258. **Polymers and Polymer Technology.** 3 hr. PR or conc.: Chem. 134. Descriptions of polymers and their handling. Properties of macromolecules as influenced by molecular weight, polymerization methods, plastics technology, polymer engineering. 3 hr. rec.

270. **Strategy of Process Engineering.** 3 hr. PR: Ch.E. 111 or consent. The latest theories of process design and process optimization, proven through regular use by practicing engineers, are applied to the major problems of process engineering. 3 hr. rec.

280. **Chemical Engineering Problems.** 1-6 hr. For juniors, seniors, and graduate students. May be used to correct deficiencies preparatory or following courses such as Ch.E. 170 and 171 or for students in other disciplines desiring to take only a portion of a course.

290. **Introduction to Nuclear Engineering.** 3 hr. PR: Junior standing. An introduction to the fundamental principles and applications of nuclear technology in science and engineering fields. Includes studies of nuclear fission and the design and operation of nuclear reactor systems; uses of radioisotopes as power sources and in materials processing, testing, and medicine; health physics and radiation detection and shielding.

301. **Transport Phenomena.** 3 hr. PR or conc: Ch.E. 231 or equiv. Introduction to the equations of change (heat, mass and momentum transfer) with a differential balance approach. Use in Newtonian flow, turbulent flow, mass and energy transfer, radiation and convection. Estimation of transport coefficients. 3 hr. rec.

307. **Distillation.** 2-5 hr. PR: Math. 18 and consent. Study of vaporization principles of separation of liquid mixtures, steam, batch, continuous, azeotropic, extractive, and molecular distillation. 3 hr. rec., 0-6 hr. lab.

323, 324. **Advanced Process Development.** 3 hr. PR: Consent. Use of extended and generalized unit process and unit operation concepts; specialized synthetic methods; reaction mechanisms and their effects on equipment design and performance; study of properties, their evaluation, prediction and marketability; industrial toxicology and plant safety. 3 hr. rec.

344. **Thermodynamics.** 3 hr. PR: Consent. Emphasis is placed on the logical development of thermodynamic principles. These are applied to selected topics including development and application of the phase rule, physical and chemical equilibria in complex systems and non-ideal solutions. Introduction to non-equilibrium thermodynamics. 3 hr. rec.

345. **Chemical Reaction Engineering.** 3 hr. PR: Consent. Homogeneous reactions, batch and flow reactors, ideal reactors, macro and micro mixing, non-ideal

flow reactors, heterogeneous reaction systems, catalytic and non-catalytic reactions, reactor stability analysis, reactor optimization. 3 hr. rec.

351. **Physical Metallurgy.** 3 hr. PR: Physics 12. Includes structure of metals, alloy diagrams, and principles of heat treating. 3 hr. rec.

354. **Ceramic Engineering II.** PR or conc: Ch.E. 253. Processing in ceramics systems. Includes the selection of ceramic raw materials and all steps required to produce a finished product; process control to develop uniformity, reliability, and reproducibility; correlations among ceramic systems. 3 hr. rec.

355. **Ceramic Engineering Laboratory.** 3 hr. PR: Consent. Application of factorial design and response surface analysis for the development of quantitative relationships in ceramic systems. 1 hr. rec. and two 3-hr. lab. periods per week.

358. **Polymer Processing.** 3 hr. PR: Chem. 134 or consent. Analytical description of rheology, molding, extrusion, bonding, polymer modification operations, and physical properities. 3 hr. rec.

370. **Process Equipment Design I.** 3 hr. PR: Ch.E. 301 or consent. Design, sizing, optimization, and cost estimation of equipment used for heat transfer; emphasis on design techniques; computer design techniques discussed where applicable. 3 hr. rec.

371. **Process Equipment Design II.** 3 hr. PR: Ch.E. 301 or consent. Design, sizing, optimization, and cost estimation of equipment used for mass transfer operations; emphasis on practical aspects of equipment design; computer design techniques discussed where applicable.

390. **Nuclear Reactor Systems I.** 3 hr. PR: Consent. Intended as a first course for graduate students in the area of power reactor systems analysis and design. Includes topics such as neutron interactions with reactor materials, fission, reactor physics, reactor heat generation and removal, and thermal reactor core design.

391. **Nuclear Reactor Systems II.** 3 hr. PR: Ch.E. 309. A continuation of Nuc.E. 390. Includes topics such as reactor kinetics, nuclear power economics, and case studies and analyses of the following reactor systems: pressurized-water, boiling-water, fast breeder, and gas-cooled power plants.

392. **Interaction of Radiation and Matter.** 1-3 hr. PR: Consent. Types of radiation, energy deposition by radiation, experimental instrumentation, formation and reactions of radiation-chemical species. 1-3 hr. rec.

393. **Nuclear Laboratory.** 1-3 hr. PR or conc: Ch.E. 390, or Ch.E. 392 or equiv. Techniques of radiation measurements. Dosimetry. Determination of neutron and gamma interaction properties with materials. Analog nuclear reactor simulation. Experiments with swimming pool reactor, neutron generator, and cobalt-60 radiation facility.

Civil Engineering

C.E.

1.° **Surveying.** 2 hr. PR: Math. 4. Elementary theory of measurement of distance, bearing and azimuth direction and difference in elevation. Field work with transit, tape, level and theodolite. Office computation and plotting. 1 hr. rec., 3 hr. lab.

5.* **Land Surveying.** 4 hr. PR: Math. 4. Primarily for forestry students. Theory and practice with compass, transit, level, stadia, and plane table; computations of area; astronomical observations; map plotting. 2 hr. rec., 6 hr. lab.

6.* **Topographic Mapping.** 2 hr. PR: C.E. 5. Primarily for forestry students. Topographic maps; surveys for roads and property lines; U. S. Public Land Surveys; practice in lettering, plotting, and inking of topographic maps. 1 hr. rec., 3 hr. lab.

90. **Introduction to Civil Engineering.** 1 hr. A survey of the historical foundations of civil engineering and the role of the profession in the future. The basic areas of civil engineering will be introduced and the process of integrating the digital computer into service for the civil engineer will be discussed. 3 hr. rec. and lab.

101. **Survey Engineering.** 4 hr. PR: C.E. 1. Theory of measurements and errors; introduction to least squares adjustments; field astronomy for determination of latitude and azimuth; horizontal and vertical curves; easement curves; earthwork volumes; triangulation; boundary surveying; omitted measurements; partition of area. 3 hr. rec., 3 hr. lab.

110. **Civil Engineering Materials.** 4 hr. PR: T.A.M. 52. The physical, chemical and molecular properties of materials commonly employed in civil engineering works, and the influence of these properties on the performance and use of these materials. Emphasis is placed on the laboratory evaluation of those properties that control the performance of materials in use and the established criteria for judging the suitability of materials for specific applications. 3 hr. rec., 3 hr. lab.

115.* **Fluid Mechanics.** 3 hr. PR: T.A.M. 52. Fluid statics, laminar and turbulent flow of compressible and incompressible fluids, flow measurements, open channel flow, and kinetics of fluids 3 hr. lab.

120. **Fluid Mechanics and Hydraulics.** 4 hr. PR: T.A.M. 52. Fluid statics, laminar and turbulent flow of compressible and incompressible fluids, flow measurements, water hammer and surging, open channel uniform and nonuniform flow, sediment transport. 3 hr. rec., 3 hr. lab.

131. **Highway Engineering.** 4 hr. PR: C.E. 101. Highway administration, economics, and finance; planning and design; subgrade soils and drainage; construction and maintenance. Design of a highway. Center line and grade projections, earthwork and cost estimate. 3 hr. rec., 3 hr. lab.

146. **Sanitary Engineering I.** 3 hr. PR: C.E. 120. Hydrology as applied to water and waste systems. Design of water distribution and waste water systems. The study and partial design of water and waste water treatment facilities. 3 hr. rec.

147. **Sanitary Engineering II.** 3 hr. PR: C.E. 120. Examination of water and waste water, water treatment, waste water treatment and special problems in public health, air pollution and radioactivity. 2 hr. rec., 3 hr. lab.

160. **Structural Analysis I.** 3 hr. PR: T.A.M. 52. Analysis of axial forces, moments and shears in statically determinate structures caused by fixed and moving loads. Study of influence lines for frames and trusses. 3 hr. rec.

169. **Introduction to Structural Design.** 3 hr. PR: C.E. 110, 160. Fundamental concepts of structural design in steel, reinforced concrete and timber for axially loaded members, members in bending, and members subjected to axial load and bending. 3 hr. rec.

180. **Soil Mechanics.** 4 hr. PR: C.E. 120, C.E. 110. Origins and distributions of soils, classification of soils, fundamental soil properties, and stresses in soils. Subsurface exploration. Introduction to foundations design and the design and construction of earth structures. 3 hr. rec., 3 hr. lab.

190. **Civil Engineering Problems.** 1-4 hr. For junior and senior students.

195. **Seminar.** Credit. PR: Junior or senior standing. Lectures and seminars given by noted civil engineering practitioners and educators. Topics to be considered include structural engineering, foundation engineering, environmental engineering, transportation engineering, and other relevant subjects.

212. **Concrete and Aggregates.** 3 hr. PR: C.E. 110 or consent. Considerations and methods for the design of concrete mixes. Properties of portland cement and aggregates and their influence on the design and performance of concrete mixtures. Test methods for concrete and aggregates and the significance of these tests. 2 hr. rec., 3 hr. lab.

213. **Construction Methods.** 3 hr. PR: C.E. 110, 180. The study of construction methods, equipment, and administration with particular emphasis on the influence of new developments in technology. 2 hr. rec., 3 hr. lab.

222. **Open Channel Flow.** 3 hr. PR: C.E. 120. An analysis of the hydraulic problems associated with natural waterways, man made waterways, and the design of the hydraulic structures of open channels. 3 hr. rec.

232. **Principles of Transportation Engineering.** 3 hr. PR: C.E. 131 or consent. A basic approach to the problem of integrated transportation systems from the standpoint of assembly, haul, and distribution means. Analysis of the characteristics of the transport equipment and traveled way. Power requirements, speed, stopping, capacity costs, economics of location and route selection will be discussed. Future technological developments and innovations will be considered. 3 hr. rec.

235. **Railway Engineering.** 3 hr. PR: C.E. 101. Development and importance of the railroad industry. Principles of location, construction, operation, and maintenance. 3 hr. rec.

251. **Public Health Engineering.** 3 hr. PR: C.E. 146 or 147 or consent. The engineering aspects involved in the control of the environment for the protection of the health and the promotion of the comfort of man. Discussions will include communicable disease control, milk and food sanitation, air pollution, refuse disposal, industrial hygiene, and radiological health hazards. 3 hr. rec.

252. **Water Resources Engineering.** 3 hr. PR: C.E. 120. Design of water-resources systems. The interrelationship between economic objectives, engineering analysis and government agencies. 3 hr. rec.

260. **Structural Analysis II.** 3 hr. PR: C.E. 160. An introduction to the fundamental theory of statically indeterminate structures. General theory of continuity and

iterative and energy methods applied to the analysis of indeterminate beams and frames. 3 hr. rec.

270. **Structural Design I.** 3 hr. PR or conc: C.E. 169. Theory and design of reinforced concrete members. Design considerations for concrete bridges and buildings. 2 hr. rec., 3 hr. lab.

271. **Structural Design II.** 3 hr. PR or conc: C.E. 169. Design of steel bridge and building structures. Welded, riveted, and bolted connections; simple and moment-resistant connections; cost estimates. 2 hr. rec., 3 hr. lab.

281. **Foundations Engineering.** 3 hr. PR: C.E. 180. Soils exploration and the design and analysis of engineering foundations. Particular emphasis on earth pressures and the design of retaining walls, studies of bracing systems and the elements of shallow and deep foundations for bridges and buildings. Movement of water through soil structures and control of water in excavations. 3 hr. rec.

291. **Comprehensive Project for Civil Engineers.** 3 hr. PR: Senior standing or consent. The application of civil engineering principles, through group studies, to develop a solution for a comprehensive engineering problem. Consideration will be given to a problem involving all aspects of civil engineering. 2 hr. rec., 3 hr. lab.

307. **Photogrammetry.** 3 hr. PR: C.E. 101. Geometry and interpretation of aerial photography; flight planning; radial-line control; principles of stereoscopy; plotting instruments. 2 hr. rec., 3 hr. lab.

308. **Geodesy.** 3 hr. PR: C.E. 101. Precise base line measurements, triangulation and leveling, geodetic astronomy; figure of the earth, map projections; rectangular coordinate systems; least squares adjustment; gravity. 3 hr. rec.

310. **Bituminous Materials and Mixtures.** 3 hr. PR: C.E. 110 or consent. Manufacture, testing, and nature of bituminous materials. Principles of the design and behavior of bituminous mixtures including the influence of aggregates, temperature, and other variables on the design for stability and durability. Significance of test methods and specifications. Construction practice. 2 hr. rec., 3 hr. lab.

311. **Pavement Design.** 3 hr. PR: C.E. 110, 180. Effects of traffic, soil, environment, and loads on the design and behavior of pavement systems. Design of flexible and rigid pavements, bases, and sub-bases. Consideration of drainage and climate. Pavement performance and performance surveys. 2 hr. rec., 3 hr. lab.

332. **Airport Planning and Design.** 3 hr. PR: C.E. 131 or consent. Airport financing, air travel demand modeling, aircraft trends, air traffic control, site selection, ground access, noise control, geometric design, pavement design, and terminal facilities. 3 hr. rec.

333. **Geometric Design of Highways.** 3 hr. PR: Consent. The theory and practice of the geometric design of modern highways. Horizontal and vertical alignment, cross-slope, design speed, sight distances, interchanges, and intersections are discussed. Critical analysis of design specifications. 2 hr. rec., 3 hr. lab.

334. **Introduction to Traffic Engineering.** 3 hr. PR: C.E. 131. This course will provide instruction in the purpose, scope, and methods of traffic engineering.

Emphasis will be placed upon the three basic elements of the transportation system, i.e. the human, the vehicle, and the roadway. The characteristics of each element and interactions between the elements will be studied. The laboratory will be devoted to conducting simple traffic studies, solving practical problems, and designing traffic facilities. 2 hr. rec., 3 hr. lab.

345. **Properties of Air Pollutants.** 3 hr. PR: Consent. Physical, chemical, biological, and social behavioral properties of dusts, droplets, and gases in the atmosphere. Air pollutant sampling and analysis. The planning and operation of air pollution surveys. 2 hr. rec., 3 hr. lab.

349. **Solid Waste Disposal.** 3 hr. PR: Consent. Study of traditional patterns and problems of solid waste storage, transport, and disposal. Examination of various engineering alternatives with appropriate consideration for air pollution control, water pollution control, and land reclamation. Analytical approaches to recovery and reuse of materials. 2 hr. rec., 3 hr. lab.

350. **Sanitary Chemistry and Biology.** 3 hr. PR: C.E. 147 or consent. Study of the physical and chemical properties of water. Theory and methods of chemical analysis of water, sewage, and industrial wastes. Biological aspects of stream pollution problems. 2 hr. rec., 3 hr. lab.

356. **Principles of Biological Waste Treatment.** 3 hr. PR: C.E. 350 or consent. Examination of biological systems used in waste treatment as to ecology and function. Models used to describe system behavior are developed. Laboratory experiments are performed to understand operation and design of treatment plants. 2 hr. rec., 3 hr. lab.

359. **Basic Radiological Health.** 3 hr. PR: Consent. Fundamentals theory and terminology. Environmental and occupational hazards in the nuclear field. Radioactive waste disposal. Laboratory measurements of radioactivity. 2 hr. rec., 3 hr. lab.

361. **Statically Indeterminate Structures.** 3 hr. PR: C.E. 260. Advanced topics in indeterminate structural analysis for trusses, nonprismatic members and frames. 3 hr. rec.

363. **Introduction to Structural Dynamics.** 3 hr. PR: Math. 18 and C.E. 361 or 460. General theory for dynamic response of systems having one or several degrees of freedom. Emphasis on the application of dynamic response theory to structural design. 3 hr. rec.

372. **Plastic Design of Steel Structures.** 3 hr. PR: C.E. 260, 271, or consent. The fundamental concepts of inelastic behavior in steel. Analysis of structures for ultimate load. The influence of axial forces, shear forces, and local buckling on the plastic moment. Study of structural connections and deflections. Steel structures design. 3 hr. rec.

373. **Prestressed Concrete.** 3 hr. PR: C.E. 270. The analysis and design of determinate and indeterminate prestressed beams and frames. 3 hr. rec.

374. **Timber Design.** 3 hr. PR: C.E. 160 and Forestry 261 or consent. Emphasis on the fundamentals of modern timber design and analysis. Topics to be presented include a review of wood properties, the design of beams, columns, arches, trusses, and pole structures using dimensional lumber, glue-laminated and ply-

wood components. Detailed study of connections using nails, shear connectors, and adhesives. 3 hr. rec.

375. **Reinforced Concrete.** 3 hr. PR: C.E. 160, 270. Theory and design of slabs, beams, columns, footings, retaining walls, and concrete buildings, with emphasis on ultimate load design. 2 hr. rec., 3 hr. lab.

380. **Soil Properties and Behavior.** 3 hr. PR: C.E. 180 or consent. A study of soil mineralogy and the physico-chemical properties of soils and their application to an understanding of the behavior of soils. Included is a detailed review of the basic and classical theories of permeability, consolidation, shear strength, and compaction. The prediction of the engineering behavior of soils is viewed in light of physico-chemical concepts. 3 hr. rec.

381. **Soil Testing.** 3 hr. PR: C.E. 180 or consent. Designed to complement and expand the material covered in C.E. 380 from an experimental standpoint. Experimental studies will be conducted to demonstrate empirical and theoretical principles. Emphasis will be placed on the proper interpretation of experimental results and the application of such results to practical problems. 1 hr. rec., 6 hr. lab.

Electrical Engineering

E.E.

20.* **Introduction to Electrical Engineering.** I, II, S. 3 hr. PR: Math. 16. Fundamental definitions and concepts of electrical engineering, units, circuit elements, basic circuit laws, measurement principles, and introduction to network theory. 2 hr. rec., 3 hr. lab.

23.* **Electric Circuits I.** I, II, S. 3 hr. PR: E.E. 20, Math. 18 (or Conc.). Sinusoidal steady state, network theorems. Fourier series and classical network solutions. 2 hr. rec., 3 hr. lab.

105.* **Electrical Fundamentals I.** I, II. 4 hr. PR: Math. 18, Physics 12. Fundamental principles of electrical circuit analysis, power and power factor. Fundamentals of magnetic circuits, induced electromotive force, transformers and electrical machines. (Primarily for non-electrical engineering students.) 3 hr. rec., 3 hr. lab.

106.* **Electrical Fundamentals II.** I, II. 4 hr. PR: E.E. 105. Principles of electronics, electronic devices, amplifiers and models, digital devices and logic circuits, instrumentation and introduction to control systems. (Not open to electrical engineering students.) 3 hr. rec., 3 hr. lab.

125.* **Signals and Systems I.** I, II. 4 hr. PR: E.E. 23 or equiv., Math. 18. An introduction to the basic concepts and analysis of deterministic signals and linear systems utilizing convolution, Fourier Transforms, and Laplace Transforms. Laboratory exercises illustrate the practical application of these concepts. 3 hr. rec., 3 hr. lab.

126.* **Signals and Systems II.** I, II. 3 hr. PR: E.E. 125. Introduction to state-space methods, random signals, correlation functions, and spectral density. The concepts and techniques of this sequence of courses are applied to communication and feedback systems. 3 hr. rec.

130. **Electromechanical Energy Conversion.** I, II. 3 hr. PR: E.E. 125, 140. Fundamentals of electromechanical energy conversion, transformers, and rotating machines. 2 hr. rec., 3 hr. lab.

131. **Introduction to Power Systems.** I, II. 3 hr. PR: E.E. 130. Analysis of power system elements connected together as an integrated system for the transmission and distribution of electric power. 2 hr. rec., 3 hr. lab.

133. **Electromechanical Energy Conversion II.** I, II. 4 hr. PR: E.E. 132. Analysis of machine performance by the principles of electromechanical energy conversion. 3 hr. rec., 3 hr. lab.

140.° **Electric and Magnetic Fields I.** I, II. 3 hr. PR: Math. 18, Physics 12. Introduction to vector analysis, orthogonal coordinate systems, Maxwell's equations, scalar and vector potentials, electric and magnetic static fields, boundary-value problems, Laplace's and Poisson's equation, electromagnetic static fields. 3 hr. rec.

141. **Electric and Magnetic Fields II.** I, II. 3 hr. PR: E.E. 140. Plane waves in lossless and dissipative media, polarization, reflection and refraction of plane waves, lossless and dissipative transmission lines, waveguides, radiation and antennas. 3 hr. rec.

150.° **Electronic Properties of Materials.** I, II. 3 hr. PR: E.E. 23 or equiv. Introduction to the physical principles of electrical charge transport in solids, vacuums, and gases. Application of these principles in the study of the characteristics of diodes, transistors, lasers and other electronic devices. 3 hr. rec.

152.° **Electronics I.** I, II. 4 hr. PR: E.E. 125, 150. Principles of operation and application of electronic devices. The use of device models in amplifiers, switching circuits and power conversion applications. 3 hr. rec., 3 hr. lab.

153.° **Electronics II.** I, II. 3 hr. PR: E.E. 152. Analysis and synthesis of small signal R-C coupled and tuned amplifiers, cascade amplifiers, feedback amplifiers, large signal tuned and untuned amplifiers and oscillators. 2 hr. rec., 3 hr. lab.

154.° **Electronics II.** I, II. 4 hr. PR: E.E. 152. Theory and application of feedback. Power amplifiers. Analysis, design and application of integrated circuit building blocks. Application of linear and digital functional circuits in electronic systems. 3 hr. rec., 3 hr. lab.

200. **Seminar.** (Credit). I, II. PR: Senior standing. Special material and projects.

201.° **Electronics for Scientists.** 3 hr. PR: General physics and calculus or consent. A special course for chemists, physicists, medical researchers, and other research workers having a limited background in electronics. The material covered will begin with electrical and electronic fundamentals and lead systematically into the application of electronic instrumentation and electrical signal processing. (Not normally open to engineering students.) 2 hr. rec., 3 hr. lab.

216. **Fundamentals of Control Systems.** I. 3 hr. PR: E.E. 126. Fundamental concepts of feedback control system analysis; stability, and design in the fre-

quency, complex variable, and time domains. Includes Nyquist, root locus and state variable concepts, Mitrovic's method and Chen's method. 3 hr. rec.

218. **Engineering Analysis and Design.** I, II. 3 hr. PR: E.E. 132, 153. Application of the method of engineering analysis based upon fundamental physical laws, mathematics, and practical engineering consideration. Emphasis is placed on the professional approach to the analysis of engineering problems. 3 hr. rec.

230. **Symmetrical Components.** 3 hr. PR: E.E. 141 or consent. Analysis of polyphase systems in unbalanced and transient conditions. 3 hr. rec.

231. **Electrical Power Systems.** II. 3 hr. PR: E.E. 141 or consent. Analytical methods for steady-state performance of power systems. 3 hr. rec.

234. **Electric Power Transmission and Distribution.** 3 hr. PR: E.E. 141. Circle diagrams applied to the various problems of power transmission; phase modifier applications and an introduction to power stability. 3 hr. rec.

235. **Electrical Machinery I.** 3 hr. PR: E.E. 133 or consent. Energy state functions; Lagrange's equation; dynamic equations of motion of electromechanical systems; generalized magnetic field type, rotating, electromechanical energy converter; two phase transformations; dynamics of commutator machines; induction machines and synchronous machines. 2 hr. rec., 3 hr. lab.

236. **Electrical Machinery II.** 3 hr. PR: E.E. 133 or consent. Electromagnetic fields in electrical devices; selected topics on induction motors; selected topics in transformer engineering, including surge phenomena; insulation of electrical equipment; winding of A.C. and D.C. machines. 2 hr. rec., 3 hr. lab.

244. **Introduction to Antennas and Radiating Systems.** II. 3 hr. PR: E.E. 141 or consent. Radiation from current distributions, linear antennas, far field approximations, field equivalence theorems, aperture antennas, antenna arrays, antenna patterns, antenna gain, and application to specific antenna types. 3 hr. rec.

245. **Microwave Circuits and Devices.** I. 3 hr. PR: E.E. 141. UHF transmission line theory, impedance matching techniques, impedance charts, general circuit theory of one port and multiports for waveguiding systems, impedance and scattering matrices, waveguide circuit elements, microwave energy sources. Course will be supplemented by laboratory problems. 3 hr. rec.

252. **Electronics III.** I, II. 3 hr. PR: E.E. 154. Analysis of modulation and demodulation systems, oscillators, active filters, and microwave sources. 3 hr. rec.

253. **Physical Electronics I.** I. 3 hr. PR: E.E. 152. A study of the physical principles of electrical conduction and the application of these principles to electronic conduction in vacuum, gases and solids. Properties of semi-conductors, junction diodes and transistors, field-effect transistors. 3 hr. rec.

257. **Transistor Circuits.** II. 3 hr. PR: E.E. 153 or consent. Application of the basic principles of semiconductor electronics to junction and field-effect devices. Development of equivalent circuits for junction diodes, transistors and field-effect transistors. 3 hr. rec.

264. **Introduction to Communications Systems.** I. 3 hr. PR: E.E. 125. Introduction to the first principles of communication systems design. Analysis and comparison of standard analog and pulse modulation techniques relative to band-

width, noise, threshold, and hardware constraints are emphasized. Communication systems are treated as opposed to individual circuits and components of the system. 3 hr. rec.

271.* **Theory of Digital Computers.** I. 3 hr. PR: Senior and graduate students in Engineering, Mathematics, Physics, or Statistics. An introduction to the field of digital computer design. Topics include general computer organization, number systems and number representations, Boolean algebra and its application to computer design, and the characteristics of the major parts of a computing system. 3 hr. rec.

275. **Pulse Techniques.** II. 3 hr. PR: E.E. 127, 152. An introduction to the response of electrical networks to non-sinusoidal inputs, the analysis of active networks with large signals and the circuits and techniques used in pulse and digital equipment. Students will use the University's computing facilities by solving problems using ECAP. No previous programming is needed. 3 hr. rec.

278.* **Analogue Computers.** I, II. 3 hr. PR: Math. 18. A study of the theory and operation of analogue computers. Amplitude scaling and time scaling on the analogue computer and application of the analogue computer to the solution of differential equations. 3 hr. rec.

280. **Electrical Problems I.** I, II, S. 1-3 hr. For juniors and seniors.

312. **Feedback System Theory.** 3 hr. PR: EE. 216, 325. Signal flow graphs; sensitivity; return difference; mathematical definition of feedback; effects of feedback; multiple loop systems; multivariate systems. 3 hr. rec.

315. **State Variable Analysis of Systems.** II. 3 hr. PR: Consent. Matrix theory and linear transformations as applied to linear control systems. The state-space on time-domain study of stability, controllability, observability, etc. 3 hr. rec.

316. **Synthesis of Feedback Systems I.** 3 hr. PR: E.E. 312, 364. Methods of direct synthesis and optimization of feedback systems; Wiener theory; Pontryagin's maximum principles; dynamic programming; adaptive feedback systems. 3 hr. rec.

325. **Advanced Linear Circuit Analysis.** I. 3 hr. PR: Consent. Systematic formulation of circuit equations. The use of operational techniques to find total solutions. Applications and characteristics of the Laplace and Fourier Transforms. Matrix algebra, complex variable theory and state variables are made to circuit analysis and elementary circuit synthesis. 3 hr. rec.

328. **Modern Network Synthesis.** 3 hr. PR: E.E. 325 or consent. Two-terminal network synthesis; Brune and Bott-Duffin syntheses; four-terminal networks; modern filter synthesis; Darlington synthesis, transfer-function synthesis; ladder and lattice synthesis; potential analogy and approximation. 3 hr. rec.

330. **Electrical Machinery III.** 3 hr. PR: E.E. 133, 235, or consent. Mathematical description of a synchronous machine; steady-state, balanced synchronous operation; three-phase short-circuit analysis; single-phase short-circuit analysis; double-line-to-ground short circuit and sequential faults; short-circuit torques; starting torque; voltage dip, synchronzing phenomena and sustained oscillations. 3 hr. rec.

331. **Electrical Power Systems.** 3 hr. PR: E.E. 231 or consent. Electrical transients on power systems including traveling waves due to lightning and switching. Principles of lightning protection. 3 hr. rec.

333. **Application of Digital Computers to Power System Analysis. I.** 3 hr. PR: E.E. 231 or consent. Incidence and network matrices; algorithms for their formation; three-phase networks; short-circuit calculations; load-flow studies; transient stability. 3 hr. rec.

340. **Electromagnetic Fields and Guided Waves I.** 3 hr. PR: E.E. 141 or equiv. Plane waves in dielectrics, conducting, and anisotropic media; polarization; radiation; duality; uniqueness; image theory; equivalence principle; Green's functions; integral equations; plane wave functions. 3 hr. rec.

341. **Electromagnetic Fields and Guided Waves II.** 3 hr. PR: E.E. 340 or equiv. General theory of waveguides, cavity resonators, modes, losses, discontinuities, power considerations, scattering, perturbational and variational techniques. 3 hr. rec.

350. **Electronic Circuits. II.** 3 hr. PR: E.E. 252. An advanced study for the analysis and design of electronic circuits; low-pass and band-pass amplifiers, single-tuned and double-tuned stages, equal ripple and maximally flat responses. 3 hr. rec.

353. **Physical Electronics. II.** 3 hr. PR: E.E. 253, 257, or consent. A study of semiconductor surfaces; surface states, space charge and the field effect. 3 hr. rec.

357. **Linear Integrated Circuits. I.** 3 hr. PR: E.E. 257. An introduction to techniques of integrated circuit design and fabrication. Development of models descriptive of linear and nonlinear transistor operation. Design and analysis of high-frequency tuned, dc, and differential amplifiers. Primarily for students specializing in communication and electronics. 3 hr rec.

358. **Integrated Logic Circuits. II.** 3 hr. PR: E.E. 257 or consent. An introduction to techniques of integrated circuit design and fabrication. Development of transistor model for nonlinear operation. The design, analysis, and comparison of emitter-coupled, direct-coupled, diode-transistor, and transistor-transistor integrated logic circuits. Intended for students specializing in digital circuits. 2 hr. rec.

364. **Communication Theory. I.** 3 hr. E.E. 264 or consent. Detailed study of probability theory and its use in describing random variables and stochastic processes. Emphasis is placed on applications to problems in communication system design. 3 hr. rec.

366. **Information Theory I.** 3 hr. PR: E.E. 364. Probability concepts; theory of discrete systems; encoding; theory of continuous systems; systems with memory; the fundamental theorem of information theory. 3 hr. rec.

370. **Switching Circuit Theory I.** 3 hr. PR: E.E. 271 or equiv. This course presumes an understanding of the elements of Boolean or switching algebra. This is a study of both combinational and sequential switching circuits with emphasis on sequential networks. Advanced manual design and computer-aided-design techniques for single and multiple output combinational circuits are covered initially. Then the analysis and design of sequential circuits are considered.

Finally, the detection and prevention of undesired transient outputs are studied. 3 hr. rec.

373. **Design of Computer Arithmetic Circuits I.** 3 hr. PR: E.E. 271 or equiv. A detailed study of computer circuitry usable in performing binary arithmetic. This course deals with the logic, circuitry, and engineering aspects of digital computer equipment design. Primary emphasis is placed on the design of high speed, parallel arithmetic units using the natural binary number system. Analysis of systems for representing negative numbers. A study of various means for obtaining high speed addition, subtraction, and multiplication. 3 hr. rec.

374. **Design of Computer Arithmetic Circuits II.** 3 hr. PR: E.E. 373. A continuation of the study begun in E.E. 373. High speed binary division, floating point arithmetic, modular or residue arithmetic, and techniques for checking arithmetic are covered. Recent innovations are studied as literature becomes available. 3 hr. rec.

380. **Electrical Problems II.** I, II, S. 1-6 hr. For graduate students.

390. **Advanced Independent Study.** I, II, S. 1-6 hr. PR: Consent. Individual investigation in advanced electrical engineering subjects that are not covered in formal courses.

Industrial Engineering

I.E.

6.° **Welding, Forming, and Heat Treatment.** 2 hr. Molding and casting of nonferrous metals, oxyacetylene welding, electric welding, resistance welding of plates, pipes, tubing, etc. Lectures, recitations, demonstrations, and laboratory practice. 6 hr. lab.

7.° **Welding and Heat Transfer.** 1 hr. PR: Consent. Practice in cutting and welding steel and cast iron with oxyacetylene and arc welding equipment. Demonstration of different methods of heat treatment. One 3 hr. lab.

8.° **Machine Work.** 2 hr. Equipment, purpose and character of operations, methods of holding work, turning, boring, drilling, grinding, and shaping. Use of precision measuring instrument. Two 3 hr. labs.

20.° **Fundamentals of Industrial Engineering.** 3 hr. PR: Sophomore standing. Principles of organization and organization charts and the basic fundamentals of industrial engineering. Study of the history of labor-management relations, review of labor laws, and an examination of collective bargaining of the past and present.

100.° **Manufacturing Processes.** 3 hr. Lectures, demonstrations, and laboratory work relating to methods, types of equipment and character of operations of welding machines and machine tools. Emphasis is placed on the economic use of machine tools, assembly line manufacture, gauging, and inspection. 2 hr. rec., 3 hr. lab.

140.° **Motion and Time Study.** 3 hr. PR: Junior standing. Principles and techniques, job analysis, standardization, and formula construction; stop watch and micromotion analysis of industrial operations; development of production and incentive standards. Introduction to human factors. 2 hr. rec., 3 hr. lab.

142. **Production Control.** 3 hr. PR: I.E. 140, 213. Planning, scheduling, routing and dispatching in manufacturing operations and production control systems. Problems in industrial plant design. Layout for operation and control. Space utilization. 3 hr. rec.

170.* **Accounting for Engineers.** 3 hr. PR: Junior standing. The accounting cycle, journals, and ledgers; study of fixed assets and depreciation; interpretation of financial statements. A survey of the essentials of cost accounting. Emphasis is placed on the utilization of cost data and reports by management, indicating management's control over industrial operations. 3 hr. rec.

181. **Introduction to Digital Computation.** 3 hr. PR: Math. 2 or 3. Introduction to stored-program concepts, flow diagrams, looping decisions, input-output techniques, algebraic compilers, symbolic assembly systems, machine languages, subroutines, equipment components, and their applications. The students will have considerable opportunity to actually program numerical problems for the University's computers. The field of present and future equipment components will be surveyed, and the advantages and disadvantages of various techniques and systems will be indicated. 2 hr. rec., 3 hr. lab.

201.* **Metal-Cutting Theory and Practice.** 3 hr. PR: I.E. 100 and Ch.E. 105. Metal-cutting tools, tool materials, work materials, cutting fluids, process of chip formation, cutting forces, tool-life tests, economics of tool life, measurement of product. 2 hr. rec., 3 hr. lab.

202. **Metal Forming Manufacturing Processes.** 3 hr. PR: I.E. 100 or consent. Applications and operations of the basic metal forming processes including the primary metal working processes and the metal shearing, drawing, bending, and squeezing processes, along with the machine tools required for these processes. 3 hr. rec.

203. **Metal Forming Theory.** 3 hr. PR: I.E. 202. The mechanics and basics of metal forming with elementary theoretical and descriptive investigations of tube-sinking, deep-drawing, wire-drawing, extrusion, cold rolling, and forging. 3 hr. rec.

204. **Metal Casting Manufacturing Processes.** 3 hr. PR: I.E. 100 and Ch.E. 105 or consent. Fluidity processes used in industry covering non-permanent processes such as sand molding, centrifugal molding, investment molding, and shell molding. Some permanent mold methods will be investigated along with metal processes, molding machines, and fundamentals of costing design. 3 hr. rec.

205. **Tool Design.** 3 hr. PR: I.E. 100. Design, construction, application, and economic aspects of jigs, fixtures, and special tools used in manufacturing on a production basis. 2 hr. rec., 3 hr. lab.

213.* **Engineering Statistics.** 3 hr. PR or Conc.: Math. 17, I.E. 281 or consent. The use of graphical analysis; measures of central tendency and dispersion; normal, binominal, and Poisson distributions in engineering applications; linear regression and correlation; tests of significance, nonparametric statistics, and analysis of variance. Includes applications of statistical sampling techniques in quality control. 3 hr. rec.

214.* **Advanced Analysis of Engineering Data.** 3 hr. PR: I.E. 213. The application of advanced theories of statistical techniques to analyze and interpret industrial

problems. Subjects include multiple regression, curvilinear regression, analysis of variance, randomized complete blocks, Latin Square designs, factorial designs, transformations, and analysis of response curves. Accent is on proper design of experiments, proper interpretation of results, and thorough consideration of all errors of estimation and errors of inference. 3 hr. rec.

215. **Statistical Decision Making.** 3 hr. PR or Conc.: I.E. 213. Basic concepts of probability theory, discrete and continuous distributions, joint and derived distributions, with applications to a large number of industrial and research problems. Also covered are such topics as expectation, properties of estimates, and Markov chains (with examples related to everyday problems). Special emphasis on the applications of probability theory in operations research, quality control, and human factors engineering. 3 hr. rec.

216. **Industrial Quality Control.** 3 hr. PR: I.E. 213. Principles and methods for controlling the quality of manufactured product, with emphasis on both economic and statistical aspects of product acceptance and process control. Development and comparison of sampling plans and control charts using both attributes and measurements. Attention is directed to problems of developing a total quality control system for monitoring the complete cycle from the early stages of design and material procurement to product use, and eventual retirement. 3 hr. rec.

220. **Theory of Industrial Engineering and Organization.** 3 hr. History and development of scientific management in industry with early works of Taylor, Galbreth, and Gantt, to the present time. 3 hr. rec.

222.* **Job Evaluation and Wage Incentives.** 3 hr. PR: I.E. 140 or consent. Principles used in evaluating jobs, rates of pay, characteristics and objectives of wage incentive plans; incentive formulae and curves. 3 hr. rec.

241.* **Methods Analysis.** 2 hr. PR: I.E. 140 or consent. An advanced study of the techniques of methods analysis as an effective means of methods improvement and cost reduction. 2 hr. rec.

243. **Plant Layout and Design.** 3 hr. PR: I.E. 142. Problems in industrial plant design. Equipment location, space utilization, layout for operation and control, flow sheets, materials handling. Allied topics in power utilization, light, heat, and ventilation. 1 hr. rec., 6 hr. lab.

249. **Design of Dynamic Material Systems.** 3 hr. PR: I.E. 140, 142 or consent. The application of industrial engineering theory and practice to the selection of material systems and equipment. This is to include the efficient handling of materials from the first movement of raw materials to the final movement of finished product. Present quantitative design techniques will be included. 3 hr. rec.

250. **Introduction to Operations Research.** 3 hr. PR: I.E. 213. A study of the basic tools and philosophies of operations research. Tools to be presented include: linear programming, queueing theory, inventory theory, and simulation. Other operations research techniques will be presented as they relate to the overall systems philosophy.

251. **Analytical Techniques of Operations Research.** 3 hr. PR: I.E. 213. A study of the analytical techniques used in operations research and industrial engineering with special emphasis on their application to industrial systems and

operations. Optimizing techniques will be presented for a wide range of situations. Specific techniques to be covered include: differentiation of continuous functions, differencing of discrete functions, Lagrangian multipliers, and Kuhn-Tucker conditions. Other optimizing techniques to be presented include linear programming, quadratic programming, geometric programming, branch-and-bound methods, and search techniques.

259. **Introduction to Systems Engineering.** 3 hr. PR: I.E. 214; Conc.: I.E. 250, 277. The nature of scientific methodology including: quantitative synthesis and models with accompanying objectives and restrictions, definition of terms, sampling and measurement of components of the model, development and testing of assumptions, optimization techniques, testing and controlling the model and the solution, and error sensitivity of the model. Emphasis will also be toward development of the problem-solver's ability to successfully assign resources to the problem solution phases in a manner such as to equalize the marginal cost of improving the model's reliability. This course will provide an opportunity for the student to analyze an operation as it may interact with the whole system. 3 hr. rec.

260. **Human Factors Engineering.** 3 hr. PR: Consent. An examination of human factors engineering and man-machine systems to include a study of ambient environment, human capabilities and equipment design. Application of human factors engineering in workplace design, maintainability, and task design methodology. Study of system design for man-computer interface, life support requirements, simulators and man-machine systems. 2 hr. rec., 3 hr. lab.

270.* **Standard Manufacturing Costs.** 3 hr. PR: I.E. 170. Development of standards for labor, material, and overhead expenses; uses of standards for control; analyses of variances between standard and actual costs. 3 hr. rec.

277.* **Engineering Economy.** 3 hr. PR: Junior standing. Comparison of the relative economy of engineering alternatives; compound interest in relation to calculation of annual costs; present worth and prospective rates of return on investments; methods of depreciation; sunk costs; increment costs; general economy studies with emphasis on retirement and replacement of equipment; consideration of taxes, public works, and manufacturing costs as related to economic solution of engineering proposals. 3 hr. rec.

280. **Industrial Engineering Problems.** 1-3 hr. PR: Consent. Special problems relating to industrial engineering.

281.* **Digital Computation for Engineers.** 3 hr. Conc: Math. 16. Study of processes of broadly integrating the digital computer into service for the engineer or scientist and study of the programming process with emphasis on coding with the automatic programming language FORTRAN. Considerable use will be made of the Computer Center equipment, especially the IBM 360 Model 75. Various other programming languages will be discussed. Considerable time will also be devoted to topics such as real-time control, principles of computer functions, study of available equipment, broad use categories of equipment, etc. 2 hr. rec., 3 hr. lab.

282. **Advanced Digital Computer Concepts.** 3 hr. PR: I.E. 181 or 281 or consent. Principles of digital computer functional components. Study of digital operating systems including structure of the various subsystem components such as monitors, input output control systems, and loaders. Advanced operating system

concepts including multiprogramming, multiprocessing, teleprocessing, and time sharing will be covered. Various existing operating systems will be evaluated as well as principles in overall system design. 3 hr. rec.

283. **Information Retrieval.** 3 hr. PR: I.E. 181 or 281 or consent. Study of the tools, elements, and theories of information storage and retrieval. Areas of study include documentation, information framework; indexing; elements of usage, organization and equipment; parameters and implementation; theories of file organization and system design. 3 hr. rec.

284. **Simulation by Digital Methods.** 3 hr. PR: I.E. 213 or consent. An introduction to methods of simulation using the digital computer. Study of the methods of generating random numbers, the Monte Carlo techniques, process generators, industrial dynamics models, and methods of error analysis and reduction. The student will be provided the opportunity to use the digital computer to simulate moderately complex production, inventory, queueing, and maintenance systems. Although the primary emphasis is more practically restricted to models of industrial operations, the techniques are immediately adaptable to simulation of any physical or information system. Simulated experiments are also considered. 3 hr. rec.

285.* **Electronic Computer Data Processing.** 3 hr. PR: Senior standing. Fundamentals of digital computer operations, equipment characteristics, input and output components. Elements of number systems. Fundamentals of "IR," information retrieval. Emphasis is placed on integrated systems analysis and design, business and industrial data for computer applications, and fundamentals of programming. Existing equipment systems and the economics of their applications will be reviewed.

300. **Advanced Manufacturing Processes.** 3 hr. PR: I.E. 100. A study of the newer and more complex manufacturing methods used in industry today. Welding and forming of titanium, magnesium, beryllium, and similar metals; assembly processes; powder metallurgy; adhesives and bonds; electrical and chemical operations such as electroforming and hot-dipping operations; hot forging; high energy rate forming (HERF); automated manufacturing processes including transfer mechanisms, continuous, and point-to-point numerial control; plastic tooling and fabrication methods; marking processes; and other manufacturing processes will be examined. 3 hr. rec.

301. **Advanced Metal-Cutting Theory and Practice.** 3 hr. PR: I.E. 201. The development of metal-cutting as a science through research, cutting-fluid theory, machinability of materials, tool materials, hot machining, tool-life tests, economics of machining. 3 hr. rec.

309. **Automation in Industry.** 3 hr. PR: I.E. 100 or consent. The evolution, production fundamentals, and control systems of the principal fully automatic machine tools, both fixed and flexible, will be covered along with the basic philosophy, fundamentals, and methods of automation as practiced in industry today. 2 hr. rec., 3 hr. lab.

314. **Advanced Design of Industrial Experiments.** 3 hr. PR: I.E. 214. A study of several of the more complex statistical methods including sequential analysis, analysis of covariance, multiple range tests, transformation of data, orthogonal polynomials, large factorial experiments, confounding, fractional replication,

split-plot designs, lattice designs with one and two restrictions on treatment allocation, with special emphasis on the power, relative efficiency, and interpretation of these designs. Experimental optimization techniques also will be covered, including the sequential simplex method, pattern search, Powell's method, and Rosenbech's method.

316. **Advanced Industrial Statistics.** 3 hr. PR: I.E. 213. Advanced study of the economic application of statistics to quality control problems. Particular emphasis on developing models of quality control systems on the basis of statistical decision theory. Double and sequential sampling by attributes. Variables sampling plans. Advanced control chart methods. 3 hr. rec.

325. **Management Control.** 3 hr. PR: I.E. 170 or consent. A study of effective techniques for higher management control, including concepts and controls applicable to production management problems.

340. **Advanced Time Study.** 3 hr. PR: I.E. 140. Review of the various investigations which have been made, with special consideration given to the development of these studies into new fields. 3 hr. rec.

341. **Methods Analysis and Work Simplification.** 3 hr. PR: I.E. 140, 277. An advanced study of the techniques of methods analysis, including modern means of methods research. Development of appropriate cost analysis to accompany improved operation plans. A study of the design, installation, and administration of work simplification programs, suggestion systems, and remuneration policies, and the means of intraplant communications concerning such programs. 2 hr. rec., 3 hr. lab.

342. **Advanced Production Control.** 3 hr. PR: I.E. 250. A study of the different mathematical models useful in the design of effective production control systems. The various models to be covered include: static production control models under risk and under uncertainty, dynamic models under certainty, under uncertainty, and under risk.

353. **Applied Mathematical Programming.** 3 hr. PR: I.E. 250 or consent. Application of the assignment, transportation, and simplex algorithms to typical industrial and economic problems. The methods and computational efficiencies of the revised simplex and other algorithms are also studied and compared with the conventional methods. Computational methods of duality and the dual-simplex and primal-dual algorithms are covered. The following special topics are also included: effect of changes or addition of vectors, secondary constraints, the decomposition principles, fixed changes (intercepts), upper bound constraints, and transshipment. 3 hr. rec.

358. **Special Topics in Systems Analysis and Operations Research.** 3-6 hr. PR: Consent. Special topics from recent developments in operations research and related fields. Special emphasis will be placed on interests of current graduate students.

359. **Operations Research for Public Administration.** 3 hr. (I.E. students are not allowed to enroll in this course.) The use of quantitative models in complex public systems. Specific attention given to the formulation of the models and an interpretation of their value in public decision-making. Case studies of different model applications also examined. 3 hr. rec.

360. **Human Factors System Design.** 3 hr. PR: I.E. 260. A study of the theoretical aspects and practical applications of man/machine relationships as they influence further system design. In this course the student will examine human limitations with respect to the acceptance of information, decision making, and the ability to transmit the result of such decisions to the controlled equipment systems for the purpose of obtaining design optimization. 2 hr. rec., 3 hr. lab.

368. **Advanced Problems in Human Factors.** 1-3 hr. PR: I.E. 260 or 360 and graduate standing. Special problems relating to one of the areas of human factors such as simulation, controls, vigilance, maintainabilty, etc.

370. **Budget Control.** 3 hr. PR: I.E. 270. Principles involved in the preparation of budgets by functional divisions and the application of divisional budgets as control media. 3 hr. rec.

377. **Advanced Engineering Economy.** 3 hr. PR: I.E. 277. Special emphasis on depreciation, engineering and economic aspects of selection and replacement of equipment; relationship of technical economy to income taxation and load factor and capacity to economy. 3 hr. rec.

381. **Integrated Data Processing.** 3 hr. PR: I.E. 281 and consent. Advanced work in electronic data-processing systems and procedures design. Case studies of integrated data-processing systems. Course projects will include individual use of a computer in management data-processing analysis problems. 3 hr. rec.

385. **Digital Computer Applications.** 1 hr. PR: Graduate standing in engineering, physical science or mathematics. Introduction to methods of digital computation and study of the programming process with emphasis on coding with an automatic programming language for scientific problems (FORTRAN). The student will have considerable opportunity to analyze engineering and scientific problems using the facilities available at the University Computer Center. 2 hr. rec., 3 hr. lab. (5-week period).

Mechanical Engineering

M.E.

1. **Engineering Graphics.** 3 hr. Lettering, use of instruments, geometric construction, orthographic projection, section and conventions, auxiliary views, descriptive, pictorial sketching, dimensioning. 2 hr. rec., 4 hr. lab.

10. **Kinematics of Mechanisms.** 3 hr. PR or Conc.: Math. 18. Kinematic analysis and synthesis of linkage, gears, cams, and other basic mechanisms. 2 hr. rec., 3 hr. lab.

101. **Thermodynamics of Engineering.** 3 hr. PR: Physics 12, Math. 17. Principles of thermodynamics; properties of gases and vapors; vapor cycles; internal combustion engines cycles and refrigeration. Not open to students majoring in mechanical engineering. 3 hr. rec.

112. **Dynamics of Machines.** 3 hr. PR: M.E. 10. Static and dynamic force analysis in mechanical systems. Principles of vibration theory and balancing of rotating machinery. Rigid body motion and gyroscopes. 3 hr. rec.

134. **Mechanical Engineering Design.** 3 hr. PR: M.E. 112. Fundamentals of mechanical design. Analysis of stress, deformation and failure modes. Rational

design and selection of mechanical elements. Theory of lubrication and wear. Problem formulation and optimization of solutions. 3 hr. rec.

136. **Engineering Systems Design.** 3 hr. PR: M.E. 134, 182. Identification and solution of challenging engineering problems through rational analysis and creative synthesis. Planning, designing, and reporting on complex systems on individual and group basis. 6 hr. lab.

140. **Engineering Thermodynamics.** 3 hr. PR: Physics 12, Math. 17. First and second laws of thermodynamics; energy equations; properties of gases and vapors; availability and thermodynamic relations. 3 hr. rec.

141. **Engineering Thermodynamics.** 3 hr. PR: M.E. 140. Continuation of M.E. 140. Gas and vapor cycles, mixtures of gases and vapors, chemical reactions, introduction to fluid mechanics 3 hr. rec.

144. **Thermodynamics of Fluids.** 3 hr. PR: M.E. 141. The dynamics and thermodynamics of fluids. Integral formulation of basic laws for closed and open systems and control volumes. Effects of heat conduction, viscosity, and compressibility on free and boundary flows. 3 hr. rec.

152. **Heat Transfer I.** 3 hr. PR: M.E. 140 or 101. Steady state and transient conduction. Practical convection problems emphasizing the utilization of empirical relations. Thermal radiation including radiation network theory. 3 hr. rec.

170. **Mechanical Engineering Analysis.** 3 hr. PR or Conc.: Math. 18. Numerical and graphical techniques applied to the solution of mechanical engineering problems. Analog and digital computer programming. Data analysis. 2 hr. rec., 3 hr. lab.

180. **Mechanical Engineering Measurements.** 3 hr. PR: M.E. 140. Static and dynamic measurements of pressure, temperature, force, stress, displacement, etc. Calibration of instruments and error analysis. 2 hr. rec., 3 hr. lab.

182. **Engineering Systems Laboratory.** 2 hr. PR: M.E. 180; PR or Conc.: M.E. 134, 152, 144. The experimental evaluation of modern and complex engineering systems. Participation in groups with oral and written presentation of results. 6 hr. lab.

210. **Kinematics.** 3 hr. PR: M.E. 112 and Math. 18 or consent. Geometry of constrained motion, kinematics synthesis and design, special linkage. Coupled curves, inflection circle, Euler-Savary equation, cubic of stationary curvature and finite displacement techniques. 3 hr. rec.

222. **Mechanical Vibrations.** 3 hr. PR: Math. 18, M.E. 112, or consent. Fundamentals of vibration theory. Free and forced vibration of single and multiple degree of freedom systems. Solution by Fourier and Laplace transformation techniques. Transient analysis emphasized. Energy methods. 3 hr. rec.

226. **Friction, Lubrication, and Wear.** 3 hr. PR: Senior standing. Frictional phenomena in solids, liquids, and gases. Hydrodynamic lubrication theory and bearing design. Hysteresis, adhesion, abrasion, and wear effects. Examples of frictional behavior will be discussed and demonstrated. 3 hr. rec.

232. **Introductory Engineering Systems Analysis.** 3 hr. PR: Senior standing. A study of analogues and mixed systems. Similitude of mechanical, electrical, and

acoustic dynamic systems. Dimensional analysis and theory of model design. 3 hr. rec.

236. **Systems Analysis of Space Satellites.** 3 hr. PR: Senior standing. Introduction to the engineering principles associated with the analysis and design of space satellites. Emphasis is upon the interdisciplinary nature of satellite systems analysis. 3 hr. rec.

240. **Problems in Thermodynamics.** 3 hr. PR: M.E. 141 or consent. Detailed study of thermodynamic systems with special emphasis on actual processes. The problems presented are designed to strengthen the background of the student in the application of the fundamental thermodynamic concepts. 3 hr. rec.

244. **Introduction to Gas Dynamics.** 3 hr. PR: M.E. 144 or consent. Basic fundamentals of gas dynamics, one-dimensional gas dynamics and wave motion, methods of measurement, effect of viscosity and conductivity, and concepts from gas kinetics. 3 hr. rec.

252. **Heat Transfer II.** 3 hr. PR: M.E. 152. A continuation of M.E. 152, covering nonlinear extended surface; gas radiation; freezing, heat exchanger theory; recovery factor and high speed flow; and mass transfer. Also, periodic flow and application of the digital computer to problems in heat transfer. 3 hr. rec.

262. **Internal Combustion Engines.** 3 hr. PR: M.E. 101 or 141. The thermodynamics of the internal combustion engine; Otto cycle; Diesel cycle, two- and four-cycle engines, fuels, carburetion and fuel injection; combustion; engine performance, supercharging. 3 hr. rec.

264. **Heating, Ventilating, and Air Conditioning.** 3 hr. PR: M.E. 141 or consent. Methods and system of heating, ventilating, and air conditioning of various types of buildings, types of controls and their application. 3 hr. rec.

266. **Steam Turbines.** 3 hr. PR: M.E. 141. The theory of fluid dynamics and the thermodynamics of the modern turbines; materials, construction details and design of important elements; influences on economy of variations in cycles and operative ranges. 3 hr. rec.

282. **Engineering Acoustics.** 3 hr. PR: Math. 18 and consent. Use of fundamental principles of mathematics and physics to develop the basic theories of sound. Application of these theories involving sound in closed areas, the various modes of sound transmissions, noise control, and psychoacoustic criteria. 3 hr. rec.

284. **Introduction to Feedback Control Theory.** 3 hr. PR: Math. 18 and E.E. 105 or equiv. background. Fundamentals of automatic control theory. Transfer functions for components and systems. Transient and frequency response analysis using Laplace transformation, root locus, Bode, and Nyquist Techniques. 3 hr. rec.

290. **Seminar.** 1-6 hr. For junior, senior, and graduate students.

294. **Special Topics.** 1-6 hr. For junior, senior, and graduate students.

299. **Mechanical Problems.** 1-6 hr. For junior, senior, and graduate students.

322. **Advanced Vibrations.** 3 hr. PR: M.E. 222 or consent. Dynamic and harmonic analysis of multiple degree of freedom and continuous linear systems.

Lagrange's equations and matrix techniques. Use of analog and numerical techniques. 3 hr. rec.

326. **Interface Phenomena.** 3 hr. PR: M.E. 226 or consent. Phenomenological and molecular theories of adhesion. Interrelationship of adhesion and hystersis, stability criteria and non-linear effects in bearings. Recent developments in lubrication theory. Elastohydrodynamic effects, surface energy criteria, and theories of wear. 3 hr. rec.

333. **Advanced Machine Design.** 3 hr. Stresses in indeterminate machine parts, experimental stress analysis. Design for high temperatures, pressures and speeds. Bearings and lubrication. Rotating discs and elastic stability and high speeds. Residual stresses and creep. 3 hr. rec.

340. **Advanced Thermodynamics I.** 3 hr. PR: M.E. 141. Definitions and scope of thermodynamics. First and Second laws, Maxwell's relation. Calpeyron relations, equations of state, thermodynamics of reactive systems, availability.

342. **Advanced Thermodynamics II.** 3 hr. PR: M.E. 340 or consent. Methods of statistical mechanics; concept of temperature; perfect diatonic gases and crystalline solids, Jacobian equations of thermodynamics; grand potential function.

350. **Conduction Heat Transfer.** 3 hr. PR: M.E. 152 or consent. Analytical, numerical, graphical, and analog solutions of steady and non-steady heat conduction problems in isotropic and anistropic solids. Representative topics include: thermal properties, extended surfaces, thermal stress, interphase conduction with moving interface, localized and distributed sources.

353. **Convection Heat Transfer.** 3 hr. PR: M.E. 152 or consent. Rigorous study of the fundamental mechanisms of the heat convection processes in both laminar and turbulent flows. Analytical, numerical and analogical solution as applied to convective systems. Selected topics for discussion as related to student interest and study of current research publications.

355. **Radiation Heat Transfer.** 3 hr. PR: M.E. 152. Classical derivation of black body radiation laws; grey body and non-grey analysis; radiant properties of materials, radiant transport analysis, specular-diffuse networks, gas radiation, thermal radiation measurements: analytical, numerical solutions, and study of selected current publications.

364. **Turbomachinery.** 3 hr. PR: M.E. 101 or 141. A study of flow problems encountered in the design of water, gas, and steam turbines, centrifugal and axial flow pumps and compressors, design parameters.

380. **Engineering Similitudes.** 3 hr. PR: Consent. Development of the dimensional analysis concepts and techniques and their application in model design. Rational approach to the design of distorted models. Study of analogies from and standpoint of model-prototype relations. 3 hr. rec.

390. **Seminar.** 1-6 hr. For senior and graduate students.

394. **Special Topics.** 1-6 hr. For senior and graduate students.

Theoretical and Applied Mechanics

T.A.M.

51. **Engineering Mechanics I.** 4 hr. PR: Math. 15, E. 2, or consent. Statics of rigid and deformable bodies. Vector operations, forces, moments, resultants, centroids, equilibrium, free body diagrams, trusses and frames, simple axial and shear stresses, mechanical properties of engineering materials, torsion, combined axial and torsion stresses, Mohr's circle of stress and strain, second moments of areas and volumes. 3 hr. lec., 2 hr. lab.

52. **Engineering Mechanics II.** 4 hr. PR: Math. 16, T.A.M. 51, or consent. Continuation of T.A.M. 51 including dynamics of particles and rigid bodies. Shear and moment diagrams, stresses and deflections of beams, elastic columns, friction, particle kinematics, rigid body kinematics, particle kinetics; force, mass acceleration of rigid bodies, work-energy methods, momentum. 3 hr. lec., 2 hr. lab.

101. **Statics.** 3 hr. PR: Math. 17, Physics 11 or Conc.: Math. 17. Fundamental definitions and the concept of static equilibrium; systems of forces and couples; application to solution of trusses and frames; centroids and moments of inertia. Programmed instruction will be utilized in certain sections of this course. 3 hr. rec.

102. **Mechanics of Materials I.** 3 hr. PR: T.A.M. 101 and Math. 17. Stress, strain, stress-strain relationships; Mohr stress and strain circles; load-stress and load-deformation relationships for axial, torsion, bending, and buckling loads; inelastic theory is considered; deflections; column theory. 3 hr. rec.

103. **Mechanics of Materials II.** 3 hr. PR: T.A.M. 102 and Math. 17. Theories of failure and design procedures; survey of experimental stress analysis; fatigue, energy, creep, relaxation, and temperature considerations; Laboratory work in behavior of common engineering materials under load; evaluation and interpretation of mechanical properties. 2 hr. rec., 3 hr. lab.

104. **Dynamics.** 3 hr. PR: T.A.M. 101 and Math 17. Fundamentals of Newtonian mechanics; kinematics of particles and plane rigid bodies; principles for work-energy and impulse-momentum applied to particles, and rigid bodies in translation, rotation, and general plane motion; application to engineering problems. Programmed instruction will be utilized in certain sections of this course. 3 hr. rec.

202. **Advanced Laboratory.** 3 hr. PR: Consent. Applied engineering measurements and instrumentation dealing with mechanical phenomena as force, displacement, pressure, torque, velocity, and acceleration. Introduces students to various transducer, signal conditioning, and readout equipment. Time allowed for term project of specific student interest. Offered spring of even years.

280. **Special Problems in Mechanics.** 1-3 hr. PR: Consent. For junior, senior, and graduate students. Offered every semester and summer.

300. **Advanced Mechanics of Materials I.** 3 hr. PR: T.A.M. 52 or consent. Theories of failure and design procedures; time and temperature dependent behavior; shear center, unsymmetrical bending, curved beams. 3 hr. rec. Offered each fall.

301. **Theory and Application of Oscillatory Phenomena.** 3 hr. PR: T.A.M. 104. Study of oscillations of vibrations in acoustical, electrical, hydraulic, and mechanical systems. 3 hr. rec. Offered spring of even years.

304. **Perturbation Methods.** 3 hr. PR: Consent. A unified treatment of formal perturbation methods used in solving engineering problems with linear and non-linear differential equations that are unsolvable by elementary techniques. Topics to be covered include the conventional perturbation technique, inner and outer expansions, methods of multiple scales, the iteration technique and other current, related methods of analysis. Offered each fall.

305. **Analytical Methods in Engineering I.** 3 hr. PR: Consent. A course designed to provide training in the applications of modern mathematics to engineering problems. Course content includes: index notation for determinants, matrices, and quadratic forms; linear vector spaces, linear operators including differential operators; eigenvalue problems. Offered each fall.

306. **Analytical Methods in Engineering II.** 3 hr. PR: Consent. Usually a continuation of T.A.M. 305 although course content may vary to suit special needs or interests of students. Subject matter usually chosen from advanced topics in linear and nonlinear analysis. Offered each spring.

310. **Advanced Mechanics of Materials II.** 3 hr. PR: Consent. Beams on elastic support, torsion of non-circular sections, thick wall cylinders and rotating disks, contact stresses, stress concentrations. Energy methods. Other special topics. 3 hr. rec. Offered each spring.

312. **Inelastic Behavior of Engineering Materials.** 3 hr. PR: T.A.M. 300. Rheological aspects of inelastic behavior, inelastic load-stress relationship for members subjected to axial, bending, torsion and buckling loads. Analytical stress-strain relationships and material modeling. Combined loading, interaction curves and their use. Statically indeterminate members loaded inelastically; inelastic buckling theory. 3 hr. rec. Offered fall of even years.

316. **Energy Methods in Applied Mechanics.** 3 hr. PR: Consent. Introduction to variational principle of mechanics and applications to engineering problems; principle of virtual displacements, principle of minimum potential energy, principle of complementary energy. Castilgiano's theorem, Hamilton's principle. Applications of energy principles to theory of plates, shells, and stability. 3 hr. rec. Offered each fall.

318. **Continuum Mechanics.** 3 hr. PR: Undergraduate mechanics. A course designed to emphasize the basic laws of physical behavior of continuous media. Course content to include: analysis of stress; equations of motion and boundary conditions; kinematic analysis; rates of strain, dilatation and rotation; bulk time, rates of change; constitutive equations with special attention to elastic bodies and ideal fluids; energy equations and the first law of thermodynamics. 3 hr. Offered each fall.

320. **Theory of Elasticity I.** 3 hr. PR: Consent. A basic solid mechanics course to include: Cartesian tensors, equations for classical elasticity, energy, minimum, and uniqueness theorems for the first and second boundary value problems; St.-Venant principle, extension, torsion, and bending problems. 3 hr. rec. Offered each fall.

325. **Experimental Stress Analysis.** 3 hr. T.A.M. 103, 104. Introduction to some of the more common experimental methods of analyzing stress distributions. Classical photoelasticity, brittle lacquers, birefringent coatings, strain gage techniques and instrumentation, as applied to problems involving static, dynamic and stress distributions. 2 hr. rec., 3 hr. lab. Offered each fall.

330. **Instrumentation in Engineering I.** 3 hr. PR: Consent. Theory of measuring systems, emphasizing measurement of rapidly changing force, pressure, strain, temperature, vibration, etc. Characteristics of currently available instruments, methods of noise elimination, types of recording are studied. Students in small groups in laboratory operate modern instruments for firsthand experience. Of special value to students who will do an experimental thesis. 2 hr. rec., 3 hr. lab. Offered each spring.

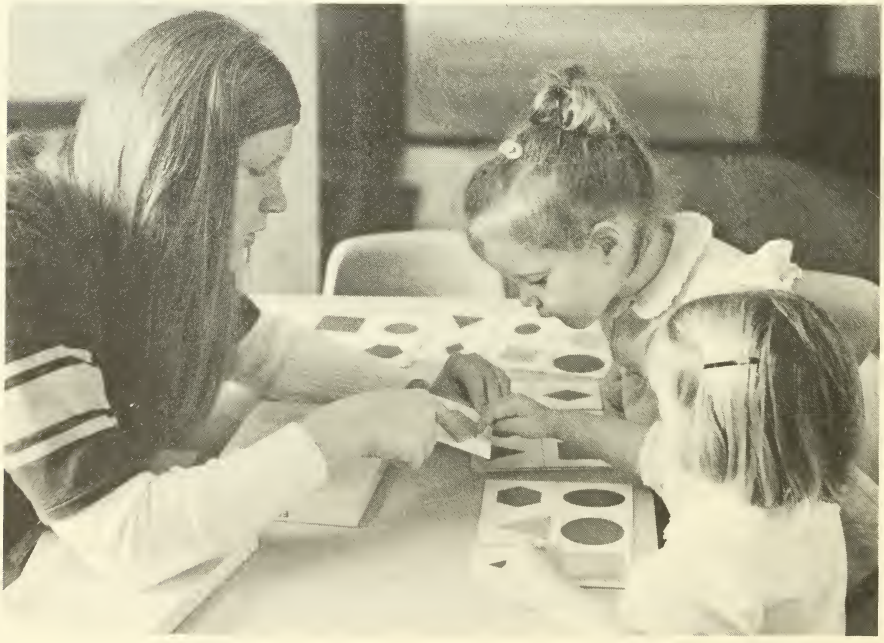
342. **Biomechanics Seminar I.** 3 hr. PR: Consent. Introduction to the principles and terminology of biomechanics, guest lecturers in anatomy, physiology, and zoology; critical review of research papers of current interest and a consideration of the sources and forms of the literature. 3 hr. rec. Offered each fall.

352. **Intermediate Dynamics.** 3 hr. PR: T.A.M. 104. The course covers Newtonian mechanics of a particle and systems of particles (including aggregate mass systems), Lagrangian dynamics and the mechanics of rigid bodies. Problems such as the dynamics of spinning tops, gyroscopes, spacecraft, etc., are considered. 3 hr. rec. Offered each fall.

353. **Advanced Dynamics I.** 3 hr. PR: T.A.M. 352 or consent. A review of the mechanics of particles and rigid bodies will precede the development of the geometric theory of dynamical systems. The stability of multi-degree-of-freedom autonomous and nonautonomous systems will be studied by the use of the Routh-Hurwitz criterion, Liaponov's direct method, Floguet's theory, variation equations, etc. Analytical solution by perturbation techniques will be presented. 3 hr. rec. Offered each fall.

360. **Flow of Non-Viscous Fluids.** 3 hr. PR: Consent. Introduction to potential theory, conservative force fields, continuity equation, energy equation, equation of state, ideal fluid. Derivation of Bernoulli equation. Complex variable with applications in potential flow. 3 hr. rec. Offered each fall.

Housing and Design Laboratory in the Division of Family Resources, College of Human Resources and Education.



Instruction in the Nursery School of the Division of Family Resources on Campus Drive, Downtown Campus.

College of Human Resources and Education

The College of Human Resources and Education includes the Divisions of Clinical Studies, Education, and Family Resources.

It brings together the several University disciplines and professions devoted to the study of maximum development of human talent and resources, whether in the context of the school, the family, or the community.

FACULTY

William G. Monahan, Ed.D. (Mich. St. U.), *Dean of the College of Human Resources and Education and Professor.*

Arthur N. Hofstetter, Ed.D. (U. Va.), *Associate Dean for Teacher Education and Professor.*

Ernest R. Goeres, Ph.D. (U. Iowa), *Assistant to the Dean and Assistant Professor.*

Division of Clinical Studies

Peter Belch, M.A. (WVU), *Instructor (part-time).*

Thomas L. Blaskovics, Ph.D. (U. Wisc.), *Associate Professor.*

William T. Brandy, Ph.D. (U. Okla.), *Assistant Professor.*

Duane Brown, Ph.D. (Purdue U.), *Associate Professor; Chairman of Counseling and Guidance.*

Rosemary Dauterive, M.A. (LSU), *Instructor (part-time).*

James S. DeLo, Ph.D. (U. Pitt.), *Associate Professor.*

Celeste Dye, Ph.D. (Purdue U.), *Visiting Assistant Professor.*

Marilyn Fairbanks, M.A., (WVU), *Instructor.*

Kathryn Greever, Ed.D. (WVU), *Research Associate.*

John Galassi, Ph.D. (U. Calif.), *Adjunct Assistant Professor.*

Thomas C. Hatcher, Ph.D. (Ohio St. U.), *Associate Professor.*

Edward Jacobs, Ph.D. (Fla. St. U.), *Assistant Professor.*

Judy Rae Kelley, M.S. (WVU), *Instructor (part-time).*

Eddie C. Kennedy, Ed.D. (Ind. U.), *Professor.*

Norman J. Lass, Ph.D. (Purdue U.), *Assistant Professor.*

JoAnn Layne, M.S. (San Fernando Val. St. C.), *Assistant Professor.*

Paul A. Leary, Ph.D. (U. Mass.), *Assistant Professor; Director of Training, Research and Training Center.*

Thomas P. Lombardi, Ed.D. (U. Ariz.), *Associate Professor.*

Glen P. McCormick, Ph.D. (Purdue U.), *Associate Professor.*

Ranjit K. Majumder, Ph.D. (U. Okla.), *Assistant Professor; Director of Research, Research and Training Center.*

Robert L. Masson, Ed.D. (SUNY), *Associate Professor; Chairman of Rehabilitation Counseling.*

Ann L. Meissner, Ph.D. (U. Wisc.), *Associate Professor.*

Joseph Moriarty, Ph.D. (Fordham U.), *Associate Professor; Director of Research and Training Center.*

Gabriel A. Nardi, Ph.D. (U. Wisc.), *Associate Professor.*

Robert H. Neff, Ed.D. (WVU), *Professor; Chairman of Special Education.*

Michael Oliverio, M.A. (WVU), *Instructor (part-time).*

John Panza, M.A. (WVU), *Instructor (part-time).*

Evelyn Raber, M.A. (WVU), *Instructor (part-time).*

Wilbert E. Rankin, M.S. (U. Pitt.), *Associate Professor.*

Martin Saltz, Ph.D. (U. Conn.), *Associate Professor.*
Manford A. Sonstegard, Ph.D. (Northwestern U.), *Professor.*
David J. Srebalus, Ed.D. (Ind. U.), *Assistant Professor.*
Charles K. Stuart, Ed.D. (Colo. St. C.), *Assistant Professor.*
Rebecca Supler, M.S. (U. Pitt.), *Instructor.*
Susanna M. Waddell, M.S. (WVU), *Instructor (part-time).*
Michael T. Yura, Ph.D. (Ohio St. U.), *Assistant Professor.*

Division of Education

John O. Andes, Ed.D. (U. Fla.), *Associate Professor.*
Benjamin H. Bailey, Ed.D. (U. Fla.), *Associate Professor.*
Sheldon R. Baker, Ed.D. (West. Res. U.), *Associate Professor.*
Patrick E. Balch, A.B. (Chico St. C.), *Instructor.*
Robert D. Baldwin, Ph.D. (Cornell U.), *Professor Emeritus.*
Laddie R. Bell, Ed.D. (U. Va.), *Associate Professor; Coordinator of Graduate Cooperative Programs.*
Thomas J. Brennan, Ed.D. (Bradley U.), *Professor; Coordinator of Industrial Arts.*
Walter S. Bower, Ph.D. (WVU), *Assistant Professor.*
John L. Carline, Ph.D. (Syracuse U.), *Associate Professor; Chairman of Curriculum and Instruction.*
Michael A. Caruso, M.A. (WVU), *Instructor; Adviser for Extension Students.*
Wincie A. Carruth, Ph.D. (NYU), *Professor.*
Gloria J. Cunningham, M.S. (WVU), *Instructor.*
Harley V. Cutlip, M.S. (WVU), *Instructor.*
Stanley V. Delidow, Ed.D. (Wayne St. U.), *Assistant Professor.*
Paul W. DeVore, Ed.D. (Penn. St. U.), *Professor.*
J. William Douglas, Ph.D. (Ohio St. U.), *Associate Professor; Chairman of Physical Education.*
Glenn D. Elliott, M.S. (WVU), *Instructor.*
Mildred E. Fizer, M.S. (U. Wisc.), *Instructor.*
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Richard C. Franklin, Ed.D. (Columbia U.), *Professor.*
Michael F. Gates. Ed.D. (WVU), *Assistant Professor.*
Wilson I. Gautier, Ed.D. (WVU), *Associate Professor.*
Mary Jane Glasscock, M.M. (WVU), *Instructor.*
Ernest R. Goeres, Ph.D. (U. Iowa), *Assistant Professor; Assistant to the Dean.*
Harold I. Goodwin, Ph.D. (U. Calif.), *Associate Professor; Chairman of Education Administration.*
James G. Harlow, Ph.D. (U. Chicago), *Professor.*
Harry B. Heflin, Ph.D. (U. Pitt.), *Professor.*
Arthur N. Hofstetter, Ed.D. (U. Va.), *Professor; Associate Dean for Teacher Education.*
Boyd D. Holtan, Ed.D. (U. Ill.), *Professor.*
Frederick J. Holter, Ph.D. (NYU), *Professor Emeritus.*
Ronald V. Iannone, Ed.D. (Ind. U.), *Associate Professor.*
Warren G. Kelley, Ed.D. (U. Mo.), *Associate Professor.*
J. Dan Knifong, Ph.D. (U. Ill.), *Assistant Professor.*
Betty J. Lambert, M.A. (Marshall U.), *Coordinator of Student Teaching Experiences–Wood County; Instructor.*
Betholene F. Love, M.S. (U. Okla.), *Associate Professor.*
Rogers McAvoy, Ph.D. (Ind. U.), *Associate Professor; Chairman of Educational Psychology.*

Paul R. McGhee, Ph.D. (Syracuse U.), *Assistant Professor; Director of Field Experiences.*
O. Claude McGhee, Ph.D. (Ohio St. U.), *Associate Professor.*
C. Everett Marcum, Ph.D. (Ind. U.), *Professor.*
James A. Martin, Ed.D. (U. Tenn.), *Associate Professor.*
Delmas F. Miller, Ph.D. (U. Pitt.), *Professor.*
William G. Monahan, Ed.D. (Mich. St. U.), *Professor; Dean of the College of Human Resources and Education.*
Roy A. Moxley, Ph.D. (U. Mich.), *Assistant Professor.*
C. Kenneth Murray, Ph.D. (Ohio St. U.), *Assistant Professor.*
Anne N. Nardi, M.A. (U. Wisc.), *Assistant Professor.*
Caroline A. Neal, M.A. (WVU), *Instructor.*
Franklin Parker, Ph.D. (Cornell U.), Ed.D. (Geo. Peabody U.), *Professor.*
John J. Paterson, Ed.D. (Mich. St. U.), *Associate Professor.*
Perry Phillips, Ed.D. (WVU), *Assistant Professor.*
David A. Puzzuoli, Ed.D. (WVU), *Associate Professor.*
Alice Semon, M.A. (WVU), *Assistant Professor.*
John Semon, M.S. (WVU), *Associate Professor.*
Edwin R. Smith, Ed.D. (WVU), *Assistant Professor.*
Patricia N. Smith, B.S. (Ind. U.), *Teacher.*
Michael Tseng, Ed.D. (Ind. U.), *Professor.*
Susan B. Tucker, B.S. (WVU), *Teacher.*
Ernest Vargas, Ph.D. (U. Pitt.), *Associate Professor.*
Julie S. Vargas, Ph.D. (U. Pitt.), *Associate Professor.*
Robert A. Walker, M.S. (WVU), *Instructor.*
Richard T. Walls, Ph.D. (Penn. St. U.), *Associate Professor.*
Harry G. Wheat, Ph.D. (Columbia U.), *Professor Emeritus.*
Mary L. Yeazell, Ed.D. (U. Ill.), *Associate Professor.*
C. Peter Yost, Ph.D. (U. Pitt.), *Professor; Dean of School of Physical Education.*

Division of Family Resources

Gladys R. Ayersman, M.S. (WVU), *Assistant Professor.*
Sylvia C. Bluhm, M.Ed. (Boston U.), *Instructor; State Extension Program Leader—Home Economics Demonstration.*
Martha K. Clark, M.S. (WVU), *Instructor.*
Babette Graf, M.S. (Penn. St. U.), *Associate Professor.*
Audrey G. Guthrie, M.S. (Cornell U.), *Assistant Professor; State Extension Specialist—Consumer Education and Home Management.*
William H. Hagerty, M.A. (WVU), *Instructor.*
Mary K. Hymes, M.S. (U. Hawaii), *Instructor.*
Mary R. Jones, M.S. (WVU), *Associate Professor.*
Nora MacDonald, M.S. (Iowa St. U.), *Instructor.*
Reva B. Neely, M.S. (Colo. St. U.), *Associate Professor.*
Charles R. Parker, M.A. (WVU), *Instructor.*
Betty L. Ramsey, M.S. (Colo. St. U.), *Associate Professor.*
Dottie D. Rauch, M.Ed. (Penn. St. U.), *Instructor.*
Nancy Reese, M.A. (St. U. Iowa), *Instructor (part-time).*
Carolyn C. Sears, M.S. (WVU), *Director, University Laboratory Nursery School.*
Carl B. Taylor, Ph.D. (Penn. St. U.), *Professor.*
Patricia P. Tursi, Ph.D. (SUNY), *Associate Professor.*
Mary A. Ware, M.S. (U. Nebr.), *Instructor; Regional Training Officer.*
Ruth E. Weibel, M.S. (U. Tenn.), *Associate Professor.*

Clara M. Wendt, M.S. (Cornell U.), *Associate Professor; State Extension Specialist—Consumer and Food Economics.*
Janice I. Yeager, M.S. (U. Ill.), *Assistant Professor.*

Division of Clinical Studies

Special Education

The Department of Special Education undergraduate program is primarily a teacher preparation program. Its majors goals are to train students to become highly competent teachers of the mentally retarded and to provide multiple opportunities for the understanding of new and innovative methodological techniques. The undergraduate program is offered as a subject specialization in combination with the program for Elementary School Teachers, Grades 1 through 6, or the program for Secondary School Teachers, Grades 7 through 12.

West Virginia urgently needs trained personnel in all phases of education of handicapped children and youth. Recent State legislation mandated counties to provide services for all the handicapped school-aged population of the State. The Special Education program currently offers federal and state traineeships at the senior level for selected undergraduate students.

SPECIALIZATION FOR THE MENTALLY RETARDED, GRADES N-12*

Required Courses	*Hr.*
Sp. Ed. 250. Survey of Exceptional Children and Adults	3
Sp. Ed. 255. Introduction to Mental Retardation	3
Sp. Ed. 260. Curriculum and Methods for the Educable Mentally Retarded	3
Sp. Ed. 262, 265, 281, or approved elective	3
Sp. Ed. 280. Student Teaching Clinical Experience in Special Education	3
SPA 250. Survey of Oral Communication Disorders	3
	18

*Students who wish to be certified to teach the mentally retarded children and youth will earn 3 semester hours of student teaching at the elementary or secondary level and 3 semester hours in a program for the mentally retarded.

Special Education

Sp. Ed.

250. **Survey of Exceptional Children and Adults.** I, II, S. 3 hr. PR: Consent. Introduction to all areas of exceptionality. Topics surveyed include definition, psychological and educational characteristics, and social and vocational adjustment.

255. **Introduction to Mental Retardation.** I, II, S. 3 hr. PR: Consent. Consideration of historical, etiological, social, educational, and vocational aspects of mental retardation.

260. **Curriculum and Methods for the Educable Mentally Retarded.** I, II, S. 3 hr. PR: Sp. Ed. 250, 255 and/or consent. Organization of instruction, adaptation of teaching methods in the several curricula areas and the construction of materials.

262. **Curriculum and Methods for the Trainable Mentally Retarded.** I, II, S. 3 hr. PR: Sp. Ed. 250, 255 and/or consent. Analysis of special problems of curriculum development for the trainable child and adult and provisions for development of original construction of curricula materials.

265. **Industrial Arts in Special Education.** II, S. 3 hr. Experimentation with industrial arts and crafts suitable for instruction in special education classes. Discussion of factors involved in selection and manipulation of such media as leather, plastics, ceramics, wood, and metal.

271. **Curriculum, Materials, and Methods for Mentally Gifted.** I, II, S. 3 hr. History and philosophy, identification, curriculum, materials and methods of working with mentally gifted.

280. **Student Teaching Clinical Experience in Special Education.** I, II, S. 1-6 hr. PR: Consent. Student teaching with the mentally retarded.

281. **Special Problems and Workshop in Special Education.** I, II, S. 2-4 hr. PR: Consent. To take care of credits for special workshops and short intensive unit course on methods, supervision, and other topics.

Speech Pathology—Audiology

The WVU program in Speech Pathology-Audiology (SPA) is committed to preparing speech and hearing specialists with baccalaureate degrees. A high percentage of students completing the undergraduate program in speech and hearing pursue immediately advanced training in speech pathology or audiology, either at WVU or in other comparable programs.

The SPA program offers students practical experience in (1) Monongalia County public schools, (2) a community-type speech and hearing clinic on the WVU campus, and (3) the comprehensive WVU Medical Center Speech and Hearing Clinic.

Employment opportunities for speech and hearing specialists are extremely favorable, as are opportunities for support in graduate study. SPA currently offers deserving undergraduates support for graduate study via University assistantships and the following federal traineeships: Rehabilitation Services Administration, United States Office of Education, and Veterans Administration. The Speech Pathology-Audiology program, because of its affiliation with the American Speech and Hearing Association, encourages *all* its baccalaureate students to continue graduate study in speech pathology or clinical audiology.

General Requirements

(B.S. in Speech Pathology-Audiology)

1. Fulfill the WVU Core Curriculum requirements.

2. Present a total of 128 academic hours, including 58 upper-division hours, 8 hours of general biology, 3 hours of general psychology, 3 hours of voice and diction, 3 hours of public speaking, and 15 hours in related areas.

3. Complete a minimum of 36 hours in SPA of which at least 6 hours (200 clock hours) must be in clinical practicum, 6 hours in audiology, and 3 hours in basic speech communication and hearing science.

4. For continuation toward a degree after the third semester of enrollment, the student must maintain an overall grade-point average of 2.25, and

an average in his major area of 2.5 or better after completing 9 hours of SPA courses, as well as exhibit the personal and professional qualities predictive of success in the profession.

5. A speech evaluation is required for all SPA freshman and transfer students. All communications to SPA students are posted on the department's bulletin board in the Speech and Hearing Clinic and must be read regularly by all SPA students.

Undergraduate Program

Undergraduate students may major in Speech Pathology-Audiology. During the first two years, the program consists of fulfilling the requirements of the WVU Core Curriculum; students take biology as the laboratory science and, as time permits, elect courses in psychology and speech. They also take the survey course in speech correction (SPA 50) in the first semester of the sophomore year or the second semester of the freshman year.

During the junior and senior years, undergraduates take a variety of specialized courses beginning with offerings such as phonetics and voice science, proceeding through speech pathology, hearing problems, and other courses relating to communication disorders, and concluding with clinical practice. They also take related courses in psychology and education and sufficient electives to comprise the hours required for their degree. A typical sequence of courses in Speech Pathology-Audiology includes, in addition to SPA 50, courses numbered SPA 152, 153, 154, 156, 157, 158, 251, 252, 253, and 282.

SUGGESTED DISTRIBUTION OF COURSES FOR BACHELOR OF SCIENCE DEGREE IN SPEECH PATHOLOGY-AUDIOLOGY

First Year	Second Year
Courses to satisfy Core Curriculum	Continuation of Core Courses
Biology 1 and 2	SPA 153 and 156
Speech Com. 31 and 34	
Psychology 1	
SPA 50	
Third Year	**Fourth Year**
SPA courses including 2 hours of SPA 282 (clinical practicum for which SPA 50, 153, 156 are prerequisites)	SPA courses including 4 hours of SPA 282
Psychology or other related area*	Related area electives
Complete Core or Teacher Certification requirements	

*Third- and fourth-year psychology and related area courses will be selected from offerings approved by the student's adviser, and selected from the related area courses applicable toward clinical certification.

Upon completion of the program, students are eligible for a Bachelor of Science degree and complete the necessary undergraduate work that enables them to undertake graduate study in the field.

The bachelor's program is designed to provide a background in speech and hearing science, speech pathology, audiology and related content areas.

In order to receive credit for SPA 282, students will complete 200 clock hours of supervised clinical practice in the clinics and public schools.

The SPA program enables the student to obtain provisional certification in "speech and hearing therapy" as defined in the 1964 *Standards for Accreditation* bulletin of the West Virginia Board of Education, provided that he fulfilled the academic course requirements for the general studies curriculum and took the National Teachers Examination. Permanent state certification and eligibility for membership and certification by the American Speech and Hearing Association requires completion of a graduate degree program.

Speech Pathology-Audiology

SPA

50. **Speech Correction.** I, II. 3 hr. Introductory course for those majoring in speech pathology-audiology. Fundamentals of evaluation and therapeutic techniques of various oral communication disorders. Normal speech and language development is emphasized.

152. **Basic Speech and Hearing Science.** I. 4 hr. Consideration of the application of certain principles of the physical and social sciences to an understanding of the process of human oral communication.

153. **Applied Phonetics.** I, II. 3 hr. A study of the standard speech sounds in our language. Use of symbols for recording speech sound; application of the use of such symbols in representing various usages of speech; special emphasis on analyzing and recording defective speech. Dynamic concepts studied.

154. **Anatomy of the Speech and Hearing Mechanism.** II. 3 hr. Anatomical and physiological study of the vocal mechanisms and the ear.

156. **Articulation and Voice Disorders.** I, II, S. 3 hr. PR: SPA 50 or 250. A detailed consideration of articulation and voice disorders including speech and language retardation and esophageal speech from an etiological, diagnostic, and therapeutic point of view. Diagnostic and therapeutic procedures with these disorders will be developed.

157. **Hearing Problems.** I, II. 3 hr. PR: SPA 50 or consent. General orientation to the field of audiology and the specialties which are included. A survey of the problems of the hearing-handicapped, basic hearing instruments, measurement procedures, and general goals of hearing therapy.

158. **Bases of Aural Rehabilitation for Children and Adults.** I. 3 hr. PR: SPA 157. Study of the perceptive and behavioral problems of aurally handicapped individuals in society, and approaches to methods of alleviating and compensating for hearing loss.

220. **Introduction to Audiology.** I. 4 hr. PR: Consent. A study of the gross anatomy and physiology of the auditory mechanism; the physics of acoustic signal production; and an introduction to basic audiometric techniques and interpretation.

222. **Hearing Conservation.** I. 2 hr. PR: SPA 220 or consent. An investigation of trauma (varied) on auditory sensitivity and acuity; identification audiometry; and approaches to hearing conservation.

223. **Aural Rehabilitation.** II. 3 hr. PR: SPA 220 or consent. A survey of the rehabilitative approaches to management in the auditorially handicapped

individual. The medical, audiological and social aspects of rehabilitation will be stressed. Procedures of speech reading and auditory training will be examined and evaluated.

250. **Survey of Oral Communication Disorders.** I, II. 3 hr. (Non-majors). PR: Consent. A survey of basic concepts and principles of the disorders of speech and their treatment. Primary attention is given to the more common speech deviations. Normal speech and hearing development of children is considered. This is an orientation course for students majoring in speech as well as teachers, school administrators, psychologists, and rehabilitation workers.

251. **Advanced Speech Correction.** I, II. 3 hr. PR: SPA 156. Study of the speech-retarded child and organically based speech disorders including cleft palate, voice disorders, and language disorders in children.

252. **Stuttering.** I. 3 hr. PR: SPA 156. Theories and therapies of stuttering.

253. **Profound Organic Speech Disorders.** II. 3 hr. PR: SPA 251 or consent. Speech and language disorders related to cerebral injury. Emphasis on aphasia and cerebral palsy.

263. **Preschool Deaf Child.** I, S. 3 hr. PR: SPA 157. Emphasis on the importance of early detection and education, the language development of the congenitally deaf child, and the parents' role in early childhood education.

281. **Special Topics.** I, II, S. 1-6 hr. per sem.; max. credit 6 hr. PR: Consent. Independent study of topics in speech pathology, audiology, and speech and hearing sciences.

282. **Clinical Practice in Speech.** I, II, S. 1-6 hr. PR: Consent. Supervised diagnosis and therapy of speech disorders. (May be taken for a maximum of 3 semester hours per semester of undergraduate or graduate credit.)

283. **Clinical Practice in Hearing.** I, II, S. 1-6 hr. PR: Consent. Supervised diagnosis and therapy of hearing disorders. (May be taken for a maximum of 3 semester hours per semester of undergraduate or graduate credit.)

Division of Education

The Division of Education prepares students for the education professions. Many advances have been made in developing good learning conditions for children and youth. The teacher and other education professionals are designing and operating educational systems to provide these optimum learning opportunities. The prospective teacher is influenced as much by the way his classes are taught as by *what* he is taught. The program at WVU emphasizes individual learning, flexible schedules, student decision-making, small group interaction, and the teacher as a human being.

In the self-instruction laboratory, students work as individuals or in small groups of their own choosing. When students feel they have mastered the particular concepts or techniques, they ask to be tested. If found proficient, they go on to other tasks; if not, they continue work in the laboratory, at their own pace and at their own convenience.

Simulation techniques are employed using specially developed films. The student assumes the role of the teacher observing classroom conditions which

may prevail and makes decisions at certain critical points. He then sees the consequences of his decision as portrayed by an actual classroom under similar conditions. The student, his classmates, and his professor then discuss the situation and the results.

Micro-teaching is utilized to enable the student to teach small groups of peers and children for short periods of time. The teaching is recorded by audio or video-tape so that the student may view his own teaching and analyze it by himself or with others. Students also have direct experiences with youngsters working as teacher-aides, tutors, community-center workers, and student teachers.

The University is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary teachers, secondary teachers, school service personnel, and school administrators, with the Doctor of Education as the highest degree approved.

Orientation and Selection

To assist students in choosing a career in the area of teaching and to maintain adequate standards for admission to teacher-training, the Division of Education requires all students pursuing teacher-education programs to participate in and complete satisfactorily the Orientation and Selection Program. The student is enrolled in this program prior to or concurrently with the first course taken in the Division of Education. The transfer student who has completed the first course in education at another institution is required to complete the requirements of the Orientation and Selection Program at WVU.

West Virginia Board of Education Regulation For Teacher Certification

The West Virginia Board of Education requires that 100 of the 128 semester hours required for certification shall be completed in regularly scheduled campus courses. The 28 hours of permissible nonresidence courses may be earned by extension, home study (correspondence), radio, television, special examination, and/or military service.

Renewal of Professional Certificates

All courses for renewal of professional certificates are selected in terms of the teacher's objectives for the improvement of instruction and must be recommended by the county superintendent on a form supplied by him. The student should have this completed form when he registers.

Graduation Requirements

To be eligible for recommendations for the degrees of Bachelor of Science in Secondary Education or Bachelor of Science in Elementary Education, a candidate must:

1. Comply with the general regulations of the University concerning entrance, advanced standing, classification, examination, marks, grade points, etc.

2. Satisfy the following requirements:
   a. Complete the required courses and the minimum number of hours of approved elective courses in education, if any.
   b. Select and pursue subject specialization(s) for the B.S. in Secondary Education or the B.S. in Elementary Education.
   c. Adhere to the patterns prescribed in completing the subject specialization(s).
   d. Present a minimum of 128 hours, if in Secondary Education, and 129 hours, if in Elementary Education, of approved college credit. A general average of C as described under "General Requirements for Certification" must be attained for the above total hours. (Math. 2 will not be counted toward meeting the total hours for graduation). Forty-five of these credits must be upper-division courses.
   e. Complete 26 hours after enrolling in the Division of Education.
   f. Be at least 18 years of age, of good moral character, interested in education work, and mentally, physically, and otherwise qualified to perform the duties of a teacher.

Fulfillment of the requirements for graduation from the Division of Education, College of Human Resources and Education, qualifies a candidate to apply for recommendation for a West Virginia professional certificate.

The College may require appropriate standardized tests of its graduates.

Requirements for Temporary Certificates For Grades N, K-6, 1-9 or 7-12

A temporary certificate, valid for one year, may be issued to applicants who meet the following requirements:

1. Graduate and be recommended by the Dean of the College of Human Resources and Education.
2. Complete three-fourths of the teaching specialization(s).
3. Complete three-fourths of professional education, including student teaching and methods.
4. Complete three-fourths of the diversified concentration for grades 1-9.
5. Scholarship level expected of regular teacher-education students.

New Program for Teacher Certification

The following pages present a resume of teacher certification standards for all students entering the University after September, 1966. As of September 1, 1970, all recommendations for certification are made on the basis of the requirements shown below, or as amended in subsequent WVU catalogs.

General Requirements for Professional Certificates

West Virginia University standards for admission to the teacher education program should not be confused with the minimum state standards for certification. Admissions standards for elementary and secondary education are set forth on pages 317 and 326, respectively.

To teach in the public schools of West Virginia, one must hold a certificate issued by the West Virginia State Department of Education. Before any WVU

applicant is eligible to receive a professional certificate he must have: (1) met the minimum state requirements, (2) met the University degree requirements, (3) been recommended by the Dean of the College of Human Resources and Education as herein prescribed, and (4) taken the National Teachers Examination (the commons and the appropriate teaching area).

The College will inform each of its students who is a prospective teacher, and any other prospective teacher, upon request, of the requirements for certification, and will assist him in preparing a program of study to meet these requirements. It is the obligation of the student who desires such counsel to arrange a conference some time before the end of the sophomore year.

A candidate for certification is required to achieve a grade-point average of 2.0 (C) or better as follows: (1) on the total of college credits earned; (2) on the hours earned in education; (3) in student teaching; and (4) in each subject specialization.

The State Department of Education uses a system of calculating grade-point averages for certification purposes which differs in some respects from WVU's system. All course work attempted at WVU and at other institutions of collegiate grade will be considered. If a student earns a grade of D, F or U on any course taken no later than the semester or summer term when he has attempted a total of 60 semester hours, and if he repeats this course one time only, the first grade shall be disregarded for the purpose of determining the student's grade-point average and the second grade earned shall be used. (Effective only for students entering upon college study for the first time in the First Semester of 1968, and thereafter.)

The Division of Education employs the State Department of Education's system of calculating grade-point averages only for purposes of admission to the Division of Education, for admission to student teaching, and for assessing teaching field and education averages. Academic performance and eligibility for graduation will be assessed by the system employed by WVU which is to count only work taken at WVU each time attempted.

The Dean of the College recommends candidates for professional certificates only after the completion of work for the baccalaureate degree. To be eligible for recommendation by the University for any professional certificate, the applicant must have done student teaching under the supervision of the College.

At least 45 semester hours of upper-division work, WVU standards, are required for all teaching certificates. The qualifications herein prescribed are minimum, not optimum or maximum, and must be met by all candidates.

PROGRAM FOR ELEMENTARY SCHOOL TEACHERS, GRADES 1-9

Requirements for the Degree of Bachelor of Science in Elementary Education and for Recommendation for the Professional Certificate, Grades 1-9

Lower-Division Work

In preparing for admission to the Division of Education and the work of preparing for teaching at early childhood and elementary levels, students will register in their freshman and sophomore years in the pre-education program of the College of Arts and Sciences and pursue the program of general educa-

tion that the State Board of Education has prescribed for all students who seek recommendation for teaching certificates. This program of prescribed work is included in the "Program for Elementary Education Teachers, Grades 1-9."

Upper-Division Work

For admission to the prescribed courses in Elementary Education, students must register the final two years in the Division of Education. The following will be required:

1. A grade-point average of 2.25 on all work completed for admission to the Division of Education.

2. A grade-point average of 2.25 on all work attempted for enrollment in the student teaching block.

In lower-division work students should pursue the lower-division required courses, so that the greatest possible number of hours taken during the junior and senior years may be courses given upper-division credit.

To become eligible for recommendation for the degree of Bachelor of Science in Education and for the Professional Certificate, Grades 1-9, the student must complete the required curriculum and plan of work with a grade-point average of 2.0 (C) or better, as follows: (1) on the total of college credits earned; (2) on the hours earned in education; (3) in the subject specialization; and (4) in student teaching; and the student has been enrolled in the Division of Education for at least 26 semester hours of work, including a minimum of 8 semester hours in student teaching and methods taken at WVU.

PROGRAM FOR UNDERGRADUATE ELEMENTARY EDUCATION, GRADES 1-9

	Sophomore Year	*Required Sem. Hr.*
Required Courses		
	C&I 7. Orientation and Selection	2
	Junior Year	
	Ed. Psych. 105. Human Growth and Development	3
	Ed. Psych. 106. Human Growth and Development	3
Block*	C&I 100. Introduction to Elementary Education	3
Block*	C&I 120. Reading and Language Arts in the Elementary School	3
Block*	C&I 130. Mathematics in the Elementary School	2
	Senior Year	
Block*	C&I 140. Science in the Elementary School	2
Block*	C&I 150. Social Studies in the Elementary School	2
Block*	C&I 187. Student Teaching in the Elementary School	8
		28

*Courses blocked together should be scheduled to be taken during the same semester.

PROGRAMS FOR ELEMENTARY SCHOOL TEACHERS, GRADES 1-9, AND/OR N, K-6

	Required Sem. Hr.
LANGUAGE ARTS	18
English 1, 2. Composition and Rhetoric	6
Speech Com. 31. Basic Speech Improvement **or**	
Speech Com. 34. Basic Speech Skills **or**	
Drama 50. Oral Interpretation	3
English 35, 36. Types of Literature* **or**	
English 135, 136. Introduction to Literature*	6
Lib. Sci. 203. Library Materials for Children	3
SOCIAL SCIENCE	24-27
Hist. 1, 2. Western Civilization **or**	
Humanities 1, 2. Introductory General Course**	6
Soc. Sci. 1, 2. Introductory General Course** **or**	6
Econ. 51. Principles of Economics **and**	3
Pol. Sci. 2. American Federal System **and**	3 9
Sociol. 1. Introduction to Sociology	3
Hist. 52, 53. Growth of the American Nation	6
Hist. 153. West Virginia **or**	
Hist. 261. Econ. and Social Devel. of W. Va.	3
Geog. 7. Physical Geography, **or**	
Geog. 8. Human Geography, **or**	
Geog. 109. Economic Geography	3

*Students wishing a subject specialization in Language Arts should not take English 35, 36, or 135, 136. See subject specialization for Language Arts.

**Students wishing a subject specialization in Social Science should take Hist. 1, 2 and Econ. 51, Pol. Sci. 2 and Sociol. 1. See subject specialization for Social Science.

SCIENCE	16
Biol. 1, 2. General Biology	8
Phys. Sci. 1, 2. Physical Science†	8

†Students wishing a subject specialization in Science should not take Physical Science. See subject specialization for Science.

MATHEMATICS	12
Math. 33, 34. Introductory Math for Elementary Teachers	6
Math. 131. Structure of the Real Numbers	3
Math. 132. Informal Geometry for Elementary Teachers	3
MUSIC	7
Music 30. Appreciation of Music	3
Music 41. Music as an Art and Science†	2
Music 42. Music Materials and Procedures†	2
ART	7
Art 1. Creative Expression in the Fine Arts	2
Art 2. Creative Expression in the Applied Arts	2
Art 30. Appreciation of the Fine Arts	3

†Students wishing a subject specialization in Music should not take Music 41, 42. See subject specialization for Music.

		Required Sem. Hr.
HEALTH AND PHYSICAL EDUCATION		6
P.E. 41, 42. Physical Education for Elementary Teachers	2	
P.E. 43. Phys. Ed. for Elementary Teachers		2
Health Ed. 101. The Elementary School Health Program	2	
EDUCATION		25
C&I 7. Orientation and Selection	1	
Ed. Psych. 105. Human Growth and Development	3	
Ed. Psych. 106. Human Development and Learning	3	
C&I 100. Introduction to Elementary Education	3	
C&I 120. Reading and Language Arts in the Elementary School	3	
C&I 130. Mathematics in the Elementary School	2	
C&I 140. Science in the Elementary School	2	
C&I 150. Social Studies in the Elementary School	2	
C&I 187. Student Teaching in Elementary School	6	

SUBJECT AND EARLY CHILDHOOD SPECIALIZATIONS

The Professional Certificate, Grades 1-9, *must be endorsed* with at least one subject specialization for teaching in grades 1 through 9. The Professional Certificate must be endorsed with the early childhood specialization for teaching at the kindergarten or pre-school level. Below are listed the categories of work for each. For each subject specialization suggested, University courses to implement the state recommendations are listed. The listed courses have been suggested by the departments concerned and approved by the College.

SUBJECT SPECIALIZATIONS FOR GRADES 1 THROUGH 9

ART (Specialization)		24
a. Required Courses	19	
Art 1. Creative Expression in the Fine Arts	2	
Art 2. Creative Expression in the Applied Arts	2	
Art 11. Drawing	3	
Art 30. Appreciation of the Fine Arts*	3	
Art 113 or 114. Painting	3	
Art 121. Fundamentals of Design	3	
Art 126. Modeling—Sculpture	3	
b. Approved Electives		5
Art 12. Drawing	3	
Art 113, 114, 117, 118. Painting	3	
Art 122. Fundamentals of Design	3	
Art 127. Modeling—Sculpture	3	
Art 220. Art and the Schools	2	

*Included in the program of General Requirements.

	Required Sem. Hr.
ART (K-12, Single Comprehensive)	57
Art 11, 12. Drawing	6
Art 105, 106. Survey of Art	6
Art 113, 114. Painting	6
Art 117, 118. Painting	6
Art 121, 122. Fundamentals of Design	6
Art 126, 127. Modeling—Sculpture	6
Art 130, 131. Printmaking	6
Art (C&I) 165. Art Ed.-Elem.	3
Art (C&I) 166. Art Ed.-Secon.	3
Art 211. Figure Drawing	3
Art 260. Modern Painting (History)	3
Art (Advanced Studio Elective)	3
HOME ECONOMICS—GRADES 1-9	24
Required Courses	
Textiles and Clothing	6
TC 22. Principles of Clothing Construction TC 27. Textiles for Consumers TC 121. Clothing for the Family	any two 6
Foods; Institution Administration	3
FIA 55. Food Principles and Practices	3
Child Development and Family Relations	6
CDFR 142. Child Development II, **or**	
CDFR 246. Adolescent Development	3
CDFR 144. Introduction to Marriage and the Family **or**	
CDFR 245. Family Development	3
HOME MANAGEMENT AND FAMILY ECONOMICS	3
HMFE 161. Family Economics, **or**	
HMFE 165. Home Management, Principles and Application	3
Housing and Design	3
HD 31. Introduction to Design **or**	
HD 33. Housing Design **or**	
HD 133. Interior Design I	3
Nutrition	3
NTR 71. Introduction to Nutrition **or**	
NTR 175. Food and People	3
MODERN FOREIGN LANGUAGES—GRADES 1-9*	
FRENCH	24
Required Courses	
French 1, 2. Elementary French	6
French 3, 4. Intermediate French	6
French 103, 104, 109. Advanced French	9
L.T.M. 221. Language Teaching Methods	3

*Students who have been excused from elementary or intermediate courses will take additional work to satisfy the total semester hour requirement.

	Required Sem. Hr.
GERMAN	24
Required Courses	
German 1, 2. Elementary German	6
German 3, 4. Intermediate German	6
German 103, 104, 109. Advanced German	9
L.T.M. 221. Language Teaching Methods	3
FOREIGN LANGUAGES	
RUSSIAN	24
Required Courses	
Russian 1, 2. Elementary Russian	6
Russian 3, 4. Intermediate Russian	6
Russian 103, 104. Advanced Russian	6
Russian 144, 145. Survey of Russian Literature	6
SPANISH	24
Required Courses	
Spanish 1, 2. Elementary Spanish	6
Spanish 3, 4. Intermediate Spanish	6
Spanish 103, 104, 109. Advanced Spanish	9
L.T.M. 221. Language Teaching Methods	3
LATIN	24
Required Courses	
Latin 1, 2. Elementary Latin	6
Latin 3. Intermediate Latin	3
Latin 4. Cicero's Orations	3
Humanities 101. Classical Culture in the Modern World	3
Latin 109. Selections from Roman Prose	3
Latin 110. Selections from Roman Poetry	3
Latin 121. Survey of Latin Literature	3
LANGUAGE ARTS—GRADE 1-9	33
Required Courses	
English 1, 2. Composition and Rhetoric*	6
English 111. The English Language	3
Lib. Sci. 203. Library Materials for Children*	3
Speech Com. 31. Basic Speech Improvement* **or**	
Speech Com. 34. Basic Speech Skills* **or**	
Drama 50. Oral Interpretation*	3
English 150. Shakespeare	3
English 21 or 121. Survey: English Literature**	3
English 22 or 122. Survey: English Literature**	3
English 24, 25. American Literature**	6
Approved Electives	
English 125. World Literature **or**	
Humanities 141 **or** 142. Great Books	3

*Included in the program of General Requirements.
**These courses waive and supersede English 35, 36 and 135, 136 in the program of General Requirements.

	Required Sem. Hr.
MATHEMATICS—GRADES 1-9	21-23
Required Courses	15-16
Math. 33, 34. Intro. Math. for Elemen. Teachers	6
Math. 131. Structure of the Real Numbers	3
Math. 132. Informal Geometry for Elemen. Teachers	3
Math. 133. Intro. Modern Algebra for Teachers **or**	
Math. 333, 334. Foundations of Algebra, 4 hr.	3-4
Approved Electives	6-7
Math. 241. Introduction to Linear Algebra	3
Math. 335, 336. Foundations of Geometry, 4 hr. **or** Math. 138. Modern Geometry for Teachers, 3 hr.	
Math. 28. Finite Mathematics	3
Comp. Sci. 1. Introduction to Computer Science	3
MUSIC—GRADES 1-9	24
Required Courses	
Music 30. Appreciation of Music°	3
Music 44, 47. (Woodwind or Percussion)	1
Music 61, 62, 63, 64. Written and Aural Theory	8
Music 100, 102, 103, 105. (Band, Choral, Orchestra, Choir)	2
Music 110. Applied Music (Including at least 1 hour in Voice and 1 hour in Piano)	5
Music 151. Music Education—Elementary	3
Music 51. Conducting	2

°Included in program of General Requirements.

NOTE: Music 41, 42 are not required and do not fulfill requirements for Music as a subject specialization.

		Required Sem. Hr.
PHYSICAL EDUCATION—GRADES 1-9		20
Required Courses		
S.Ed. 70. First Aid and Emergency Allied Services		2
Dance 39. Folk and Ballroom Dance		2
P.E. 43. Physical Ed. for Elemen. Teachers		2
P.E. 71. Orientation in Physical Ed.		2
P.E. 164. Kinesiology		3
P.E. 177. Philos. and Princ. of Phys. Ed.		3
P.E. 61. (Women) Gymnastics		2
P.E. 51. (Men) Gymnastics and Volleyball		2
P.E. 31 or 32 or 54 or 63 or 64 (Women)		2
P.E. 31. Soccer and Track and Field	2	
P.E. 32. Basketball and Softball	2	
P.E. 54. Individual and Dual Sports	2	
P.E. 63. Field Hockey and Volleyball	2	
P.E. 64. Archery, Bowling, and Fencing	2	
P.E. 53 or 54 or 64 (Men)		2
P.E. 53. Soccer and Wrestling	2	
P.E. 54. Individual and Dual Sports	2	
P.E. 64. Archery, Bowling, and Fencing	2	

	Required Sem. Hr.
SCHOOL LIBRARIAN—GRADES 1-9*	21
Required Courses	
Lib. Sci. 201. Reference and Bibliography	3
Lib. Sci. 203. Library Materials for Children*	3
Lib. Sci. 205. Selection of Books and Related Materials for the Secondary School Library	3
Lib. Sci. 222. Field Practice	3
Lib. Sci. 223. Cataloging and Classification	3
Lib. Sci. 235. Organization and Administration of the Instructional Materials Center in the Elementary School	3
Ed. Psych. 260. Audio Visual Resources for Instruction	3

*For certification grades K-12, Lib. Sci. 207 must also be taken.

SCIENCE—GRADES 1-9	31
Required Courses	
Biol. 1, 2. General Biology*	8
Chem. 11, 12. General Chemistry**	8
Physics 1, 2. Introductory General Courses**	8
Astron. 106. Descriptive Astronomy	3
Geol. 5. Introduction to Geology **and**	
Geol. 2. Physical Geology Laboratory	4

*Included in the program of General Requirements.
**These courses waive and supersede Physical Science 1, 2 in the program of General Requirements.

Suggested Additional Courses	
Forestry 140. West Virginia's Natural Resources	3
Biol. 252. Flora of West Virginia	3

SOCIAL STUDIES—GRADES 1-9	33
Required Courses	27
Hist. 1, 2. Western Civilization*	6
Hist. 52, 53. Growth of the American Nation*	6
Hist. 153. West Virginia*	3
Econ. 51. Principles of Economics** **and**	
Pol. Sci. 2. American Federal System** **and**	
Sociol. 1. Introduction to Sociology**	9
Geog. 7. Physical Geography* **or**	
Geog. 8. Human Geography* **or**	
Geog. 109. Economic Geography*	3
Elective Courses	6

Six semester hours, in addition to courses taken in the General Studies program, are to be chosen from one of the five areas below:

Hist. Any 6 hours of History (with adviser's approval)	6
Econ. 52. Principles of Economics	3
and one additional course	3
Sociol. Any 6 hours of Sociology	6

*Included in the program of General Requirements.
**These courses waive and supersede Soc. Sci. 1, 2 in the program of General Requirements.

	Required Sem. Hr.
SPEECH COMMUNICATION–GRADES 1-9	21
Pol. Sci. 1 Elements of Democratic Government	3
Pol. Sci. 120. State and Local Government	3
Pol. Sci. 160. International Relations	3
Pol. Sci. 221. W. Va. Government and Administration	3
Geog. 7 Physical Geography*	
Geog. 8. Human Geography* or	
Geog. 109. Economic Geography	
and one additional course	3
Required Courses	
Speech Com. 31. Basic Speech Improvement*	3
Speech Com. 34. Basic Speech Skills	3
Speech Com. 80. Introduction to Broadcasting	3
Drama 50. Oral Interpretation*	3
SPA 250. Survey of Oral Communication Disorders or	
Speech Com. 275. Speech Problems of Children	3
Drama 282. Creative Dramatics (May substitute Drama	
180 or 284)	3
Speech Com. or Drama Elective	3

*Included in program of General Requirements—one of which has been selected.

EARLY CHILDHOOD EDUCATION–GRADES N-6*	
Required Courses	18
CDFR 141. Child Development I	3
CDFR 142. Child Development II	3
CDFR 244. Family and Individual in Community	3
C&I 210. Early Childhood Education	3
C&I 211. Early Childhood Education	3
Speech Com. 375. Speech Problems of Children or	
SPA 250. Survey of Oral Communication Disorders	3

*Students who wish to be certified in Early Childhood Education, N-6, will do student teaching at the nursery school-kindergarten and elementary school levels. Students electing this subject specialization will not be eligible to teach in junior high school unless a subject specialization, grades 1-9, is also elected.

PROGRAMS FOR PROFESSIONAL CERTIFICATES JUNIOR AND SENIOR HIGH SCHOOL

Requirements for the Degree of Bachelor of Science in Secondary Education and for Recommendation for the Professional Certificate, Grades 7-12

Lower-Division Work

In preparaing for admission to the College of Human Resources and Education and the work of preparing for teaching in the junior and senior high school, students will register for the freshman and sophomore years in the College of Arts and Sciences and pursue their prescribed program in preparation for teacher certification under the direction of the pre-education adviser.

Upper-Division Work

Upon completing 58 semester hours of approved college work and attaining a 2.25 average, a student is eligible to enter the College of Human Resources and Education. To become eligible for recommendation for the degree of Bachelor of Science in Education and for the Professional Certificate, Grades 7-12, the student must complete the requirements described in the General Requirements for the Professional Certificate. The College will lend guidance and advice to students in any other department of the University who desire secondary teacher certification.

An overall grade-point average of 2.25 is required for admission to student teaching.

PROGRAMS FOR SECONDARY SCHOOL TEACHERS

	Required Sem. Hr.
1. GENERAL STUDIES	50-58
Required Courses	
HUMANITIES	21
English 1, 2. Composition and Rhetoric	6
Speech Com. 31. Basic Speech Improvement **or** Speech Com. 34. Basic Speech Skills **or** Drama 50. Oral Interpretation	3
English 35, 36. Types of Literature* **or** English 135, 136. Introduction to Literature*	6
Art 30. Appreciation of the Fine Arts	3
Music 30. Appreciation of Music	3

*Students who qualify for certification in the field of English or in Language Arts will take English 21, 22 (or 121, 122) and 24, 25 instead of English 35, 36 or English 135, 136.

SCIENCE	8-10
Any one of the following full-year sequences:	
Biol. 1, 2. General Biology	8
Chem. 11, 12. Survey of Chemistry	8
Chem. 15, 16. Fundamentals of Chemistry	8
Geol. 1, 2, 3, 4. Physical and Historical Geology and Laboratory	8
Physical Sci. 1, 2. Introductory General Course*	8
Physics 1, 2. Introductory Physics	8
Physics 11, 12. General Physics	8

*Physical Science 1 and 2 should not be taken by any student who intends to have a teaching field in any one of these sciences.

MATHEMATICS	4
Math. 15. Calculus I **or** Math. 21, 22. Introduction to Mathematics	4

	Required Sem. Hr.	
SOCIAL STUDIES**		12-15
Hist. 1, 2. Western Civilization **or**	6	
Humanities 1, 2. Introductory General Course	6	
Econ 51. Principles of Economics **and**		
Pol. Sci. 2. American Federal System	6	
Sociol. 1. Introduction to Sociology **or**		
Soc. Sci. 1, 2. Introductory General Course	6	

**Students who plan to qualify in the field of Social Sciences should take Hist. 1 and 2 and courses in economics, political science, and sociology.

PHYSICAL AND HEALTH EDUCATION		4
Men: Two semesters of course work chosen from the following:		
P.E. 1, 2	2	
Dance 5 through 18	2	
Women: Two semesters of course work chosen from the following:		
P.E. 1 through 25	2	
Dance 5 through 18	2	
Health Ed. 102	2	

PROFESSIONAL EDUCATION–SECONDARY		
Required Courses		23
Foundation for Teaching		8
C&I 7. Introduction to Education	2	
Ed. Psych. 105. Human Development & Learning	3	
Ed. Psych. 106. Human Development & Learning	3	
Teaching Methods in Area of Specialization		3
Select one below related to teaching field:		
C&I 160. Vocational Agriculture	3	
Music 151 (C&I 167). Music Education I, Methods	3	
Music 152 (C&I 168). Music Education II, Methods	3	
C&I 174. Physical Education (P.E. 130)	3	
C&I 175. Home Economics	2	
C&I 178. Home Economics	3	
C&I 280. Workshop in:	3	
Sec. 01. Language Arts (English, Journalism, Speech Communication, and Library Science)		
Sec. 02. Math		
Sec. 03. Science		
Sec. 04. Social Studies		
LTM 221 (C&I 125). Language Teaching Methods	3	
Art 166 (C&I 166). Art Ed. in Second. Sch.	3	
General Methods and Practicum		12
C&I 104. Principles of Teaching Secondary Schools	4	
C&I 188. Student Teaching	8	
C&I 189. Student Teaching (Music Elementary)	4	
C&I 190. Student Teaching (Music Secondary)	4	
C&I 287. Student Teaching Clinical Experience	2-4	
Sp.Ed. 280. Student Teaching	3	

	Required Sem. Hr.

2. **TEACHING FIELDS**—Grades 7-12 (students must take one comprehensive field or two non-comprehensive fields.)

VOCATIONAL AGRICULTURE—Comprehensive	45-47
Required Courses—Core Program	28
Agr. Econ. 104. Farm Management	3
Agr. Econ. 180. Assigned Topics	3
Agr. Educ. 162. Group Organization and Leadership	2
Agr. Mech. 152. Shop Theory and Methods	3
Agr. Mech. 253. Advanced Farm Machinery	3
AIVS 51. Principles of Animal Science	4
Agron. 2. Principles of Soil Science	4
Agr. 11, 12. Professions in Agriculture	2
Plant Sci. 52. Principles of Plant Science	4

Agricultural education majors will satisfy requirements in mathematics by completing Math. 3.

Areas of Agricultural Minors (select one)

A. Agricultural Production and Management	18
Required Courses	15
Agr. Econ. 231. Marketing Agricultural Products	3
An. Prod. 108. Animal Production Experience, **or**	
An. Prod. 145. Milk Production, **or**	
An. Prod. 138. Grading and Selection of Meat and Meat Animals, **or**	
An. Prod. 141. Beef Production, **or**	
An. Prod. 146. Sheep Production	6
F.M. 132. Farm Woods Management	3
Hort. 242. Small Fruit Production, **or**	
Agron. 254. Pasture and Forage Crops	3
Approved Electives	3
Agr. Econ. 231, 330; Ag. Mech. 253, 259, 270, 275, 352; Agron. 210, 250; An. Nutrn. 101; Bact. 141; Food Sci. 134; Hort. 115, 117, 204; Plant Path. 201; Vet Sci. 102.	
B. Animal Processing	17
Required Courses	10
Food Sci. 106. Poultry Products Technology	2
Food Sci. 112. Dairy Technology	3
Food Sci. 134. Judging Dairy Products	2
Food Sci. 167. Meats	3
Electives	7
An. Nutrn. 101; An. Physiol. 280; An. Prod. 138, 141, 145, 146, 240; Bact. 141; Food Sci. 107; Vet. Sci. 102.	

	Required Sem. Hr.
C. Agricultural Mechanics	17
Required Courses	12
Agr. Mech. 152. Shop Theory and Methods	3
Agr. Mech. 259. Farm Structures	3
Agr. Mech. 270. Electricity in Agriculture	3
Agr. Mech. 275. Agricultural Engines	3
Electives	5
Agr. Mech. 253, 352; I.E. 6, 7, 8.	
D. Agricultural Sales and Services	18
Agr. Econ. 10. Agribusiness Accounting	3
Agr. Econ. 231. Marketing Agricultural Products	3
Agr. Econ. 235. Marketing Dairy Products	3
Agr. Econ. 240. Agricultural Prices	3
Agr. Econ. 261. Agribusiness Finance	3
Agr. Econ. 330. Cooperative Organization	3
E. Conservation	17
Required Courses	12
Agron. 212. Soil Conservation and Management	3
For. 140. West Virginia Natural Resources	3
F.M. 132. Farm Woods Management	3
Hort. 229. Landscape Design	3
Electives	5
Agron. 210, 250; Biol. 51; F.M. 12, 151, 211; R.P. 40, 142.	
F. Horticulture Produce Industry	17
Hort. 107. General Horticulture	3
Hort. 180. Assigned Topics	2
Hort. 242. Small Fruits	3
Hort. 243. Physiology of Vegetables	3
Hort. 244. Handling and Storage of Horticultural Crops	3
Hort. 245. Greenhouse Management	3
G. Ornamental Horticulture	19
Required Courses	13
Agron. 250. Turfgrass Management	3
Hort. 107. General Horticulture	3
Hort. 116. Flower Judging	1
Hort. 204. Plant Propagation	3
Hort. 245. Greenhouse Management	3
Electives	6
Agron. 210; Biol. 169; Hort. 160, 229.	

	Required Sem. Hr.
ART (Specialization)	32
Required Courses	
Art 11, 12. Drawing	6
Art 30. Appreciation of the Fine Arts*	3
Art 105, 106. Survey of Art	6
Art 113, 114. Painting	6
Art 121, 122. Fundamentals of Design	6
Art 123. Lettering	2
Art 126. Modeling—Sculpture	3
Approved Electives	
Art 117, 118. Painting	6
Art 127. Modeling—Sculpture	3

Art (Comprehensive). See page 320.

ENGLISH	39
Required Courses	
English 1, 2. Composition and Rhetoric*	6
English 111. The English Language	3
English 21 or 121. Survey: English Literature	3
English 22 or 122. Survey: English Literature	3
English 24, 25. American Literature	6
English 150. Shakespeare	3
American Literature (English 131, 220, 266)	3
Course in a major author or period before 1660 (English 161, 162, 255, 261, 262)	3
Course in a major author or period after 1660 (English 163, 164, 263, 264, 265, 267, 365)	3
Course including foreign literature in English translation (English 125, 236, 337; Humanities 141, 142)	3
Speech Com. 31. Basic Speech Improvement* or Speech Com. 34. Basic Speech Skills* or Drama 50. Oral Interpretation*	3

*Included in the program of General Requirements.

NOTE: For students in the English program, the courses in English, American, and foreign literature supersede and waive the requirements of English 35 and 36 or 135 and 136 in General Studies.

MODERN FOREIGN LANGUAGES

FRENCH	36
Required Courses	
French 1, 2. Elementary French	6
French 3, 4. Intermediate French	6
French 103, 104, 109, 110. Advanced French	12
French 115. The Classical School	3
French 118. Literature of the Nineteenth Century	3
French 217. French Civilization	3
Linguistics 111. Introduction to Structural Linguistics	3

	Required Sem. Hr.
Approved Electives*	
French 116. Literature of the Eighteenth Century	3
French 222. French Realism	3
French 231. Phonetics and Pronunciation	3

*These courses may be chosen to complete the 36-hour program of a student who, because of high-school credits, has been excused from elementary or intermediate courses. They may be substituted for French 118 and 217 with the approval of the adviser.

FRENCH (As a second language specialization)*	24
Required Courses	
French 1, 2. Elementary French	6
French 3, 4. Intermediate French	6
French 103, 104, 109, 110. Advanced French	12
Approved Electives**	
French 118. Literature of the Nineteenth Century	3
French 217. French Civilization	3
French 222. French Realism	3

*Students selecting German, Latin, Spanish, or Russian as a specialization may qualify for teaching French by completing the 24-semester-hour program.

**These courses may be chosen to complete the 24-hour program of a student who, because of high school credits, has been excused from elementary or intermediate courses.

GERMAN	36
Required Courses	
German 1, 2. Elementary German	6
German 3, 4. Intermediate German	6
German 103, 104. Advanced German	6
German 105, 106. The German Novelle	6
German 107. Nineteenth Century Drama	3
German 109, 110. Advanced German	6
Linguistics 111. Introduction to Structural Linguistics	3
Approved Electives*	
German 108. Nineteenth Century Drama	3
German 161. Lyric Poetry	3

**These courses may be chosen to complete the 36-hour program of a student who, because of high school credits, has been excused from elementary or intermediate courses. They may be substituted for German 106 and 107 with the approval of the adviser.

GERMAN (As a second language specialization)*	24
Required Courses	
German 1, 2. Elementary German	6
German 3, 4. Intermediate German	6
German 103, 104, 109, 110. Advanced German	12
Approved Electives**	
German 106. The German Novelle	3
German 107. Nineteenth Century Drama	3

*Students selecting French, Russian, Latin or Spanish as a specialization may qualify for teaching German by completing the 24-semester-hour program.

**These courses may be chosen to complete the 24-hour program of a student who, because of high-school credits, has been excused from elementary or intermediate courses.

	Required Sem. Hr.
RUSSIAN	**33**
Required Courses	
Russian 1, 2. Elementary Russian	6
Russian 3, 4. Intermediate Russian	6
Russian 103, 104. Advanced Russian	6
Russian 144, 145. Survey and Russian Literature	6
Russian 211, 212. The Russian Novel	6
Linguistics 111. Introduction to Structural Linguistics	3
RUSSIAN (As a second language specialization)*	**24**
Required Courses	
Russian 1, 2. Elementary Russian	6
Russian 3, 4. Intermediate Russian	6
Russian 103, 104. Advanced Russian	6
Russian 144, 145. Survey of Russian Literature	6
Approved Electives**	
Russian 211, 212. The Russian Novel	6

*Students selecting German, French, Latin, or Spanish as a specialization may qualify for teaching Russian by completing the 24-semester-hour program.

**These courses may be chosen to complete the 24-hour program of a student who, because of high-school credits, has been excused from elementary or intermediate courses.

SPANISH	**36**
Required Courses	
Spanish 1, 2. Elementary Spanish	6
Spanish 3, 4. Intermediate Spanish	6
Spanish 103, 104, 109, 110. Advanced Spanish	12
Spanish 212. Spanish Literature Since 1870	3
Spanish 216. Spanish Civilization and Culture	3
Spanish 221. Literature of the Golden Age to 1635	3
Linguistics 111. Introduction to Structural Linguistics	3
Approved Electives**	
Spanish 211. Nineteenth Century Literature to 1870	3
Spanish 217. Spanish-American Literature and Culture	3
Spanish 222. The Golden Age After Lope de Vega	3

*These courses may be chosen to complete the 36-hour program of a student who, because of high-school credits, has been excused from elementary or intermediate courses. They may be substituted for Spanish 212 and 216 with the approval of the adviser.

SPANISH (As a second language specialization)*	**24**
Required Courses	
Spanish 1, 2. Elementary Spanish	6
Spanish 3, 4. Intermediate Spanish	6
Spanish 103, 104, 109, 110. Advanced Spanish	12

*Students selecting French, German, Latin, or Russian as a specialization may qualify for teaching Spanish by completing the 24-semester-hour program.

	Required Sem. Hr.
Approved Electives**	
Spanish 212. Spanish Literature Since 1870	6
Spanish 216. Spanish Civilization and Culture	3
Spanish 217. Spanish-American Literature and Culture	3
Spanish 222. The Golden Age After Lope de Vega	3

**These courses may be chosen to complete the 24-hour program of a student who, because of high-school credits, has been excused from elementary or intermediate courses.

FOREIGN LANGUAGE

LATIN 36

Required Courses

Humanities 102. Classical Myths in the Modern World	3
Latin 1, 2. Elementary Latin	6
Latin 3. Intermediate Latin	3
Latin 4. Cicero's Orations	3
Latin 109. Selections from Roman Prose	3
Latin 110. Selections from Roman Poetry	3
Latin 121. Survey of Latin Literature	3
Latin 131. Latin Prose Composition	3
Latin 202. Roman Comedy	3
Latin 231. Roman Satire	3
Linguistics 111. Introduction to Structural Linguistics	3

Approved Electives*

Latin 234. Roman Historians	3
Latin 235. Roman Epic	3

*These courses may be chosen to complete the 36-hour program of a student who, because of high-school credits, has been excused from elementary or intermediate courses. They may be substituted for any of the literature above with the approval of the adviser.

LATIN (As a second language specialization)* 24

Required Courses

Latin 1, 2. Elementary Latin	6
Latin 3. Intermediate Latin	3
Latin 4. Cicero's Orations	3
Humanities 101. Classical Culture in the Modern World	3
Latin 109. Selection from Roman Prose	3
Latin 110. Selection from Roman Poetry	3
Latin 121. Survey of Latin Literature	3

*Students selecting French, German, Russian, or Spanish as a specialization may qualify for teaching Latin by completing the 24-semester-hour program.

PHYSICAL EDUCATION* 41

Required Science Courses 12

P.E. 72. Historical and Sociological Perspectives of Physical Education	3
P.E. 74. Psychological Perspectives of Physical Education	3
P.E. 164. Kinesiology	3
P.E. 165. Physiology of Motor Activities	3

*Students who wish to be certified in physical education, grades 1-12, will do student teaching at the elementary and secondary levels. C&I 174, Physical Education, Methods and Materials in High School Teaching, cross-listed with P.E. 130, must be taken.

	Required Sem. Hr.
Required Theory and Foundations Courses	17
P.E. 71. Orientation in Physical Education	3
P.E. 121. Sport Injury Control and Management	3
P.E. 125. Movement Education for Children	3
P.E. 177. Philosophy and Principles of Physical Education	3
P.E. 191. Measurement and Evaluation in Physical Education	3
P.E. 192. Organization and Administration of Physical Education	3
Required Sport and Movement Analysis Courses	12
Area of Gymnastics—One course chosen from P.E. 51, 61, 62	2
Area of Aquatics—One course chosen from P.E. 52, 58, 124	2
Area of Individual Sports—One course chosen from P.E. 54, 64	2
Area of Team Sports (Women)—One course chosen from P.E. 31, 32, 63	2
Area of Team Sports (Men)—Two courses chosen from P.E. 53, 55, 56	2
Area of Dance (Women)—P.E. 39 and one course chosen from P.E. 35, 37	2
Area of Dance (Men)—P.E. 39	2
HOME ECONOMICS (Comprehensive)	40
Required Courses	15
CDFR 144. Introduction to Marriage and the Family	3
TC 22. Principles of Clothing Construction	3
NTR 71. Introduction to Nutrition	3
HMFE 165. Home Management: Principles & Application	3
HD 31. Introduction to Design	3
Restricted Electives	25
Elect 5 hours	
CDFR 142. Child Development II	3
CDFR 145. Infant Development	3
CDFR 245. Family Development	3
CDFR 246. Adolescent Development	3
Elect 5 hours	
TC 27. Textiles for Consumers	3
TC 121. Clothing for the Family	3
TC 122. Tailoring	3
TC 227. Advanced Textiles	3
Elect 5 hours	
FIA 55. Food Principles and Practices	3
FIA 151. Meal Management	3
NTR 175. Food and People	3
NTR 273. Family and Community Nutrition	3

	Required Sem. Hr.
Elect 5 hours	
HMFE 160. Communication of Consumer Information	3
HMFE 161. Family Economics	3
HMFE 261. Consumer Economics	3
Elect 5 hours	
HD 33. Housing Design	3
HD 133. Interior Design I	3
HMFE 167. Household Equipment	3

INDUSTRIAL ARTS

No new students are being accepted in the undergraduate Industrial Arts program at this time. An extensive curriculum development project is being undertaken for the purpose of establishing a more modern and relevant curriculum model of Industrial Arts teacher education.

JOURNALISM	21
Required Courses	15
Journ. 1. Introduction to Mass Communications	2
Journ. 18. News Writing	3
Journ. 19. Copy Editing and Make-up	4
Journ. 120. Introduction to Photography	2
Journ. 125. High School Journalism	2
Journ. 227. History of Journalism	3
Approved Electives	6
Journ. 10. Visual Communication	3
Journ. 110. Typography and Printing Processes	2
Journ. 113. Principles of Advertising	3
Journ. 118. Reporting	3
Journ. 141. Advanced Journalism Problems	1-3
Journ. 182. Broadcast Journalism I.	3
Journ. 228. Law of the News Media	3
Journ. 230. Editorial and Interpretive Writing	3

NOTE: All electives listed may be counted towards a Bachelor's Degree in Journalism Education.

LANGUAGE ARTS (Comprehensive)	56
English	36
English 1, 2. Composition and Rhetoric°	6
English 21 or 121; 22 or 122. Survey: English Literature	6
English 24, 25. American Literature	6
English 111. The English Language	3
English 150. Shakespeare	3
Course in American Literature (English 131, 220, 235, 266, 283)	3
Course in a major author or period before 1660 (English 161, 162, 255, 256, 261, 262)	3
Course in a major author or period after 1660 (English 132, 163, 164, 263, 264, 265, 267, 284, 365)	3
Course including foreign literature in English translation (English 125, 234, 236, 337; Humanities 141, 142)	3

	Required Sem. Hr.
Speech Communication	15
Speech Com. 34. Basic Speech Skills*	3
Speech Com. 121. Argumentation and Debate	3
Drama 50. Oral Interpretation*	3
Drama 75. Acting	3
Drama 180. Directing	3
Journalism	5
Journ. 18. News Writing	3
Journ. 125. High School Journalism	2

*Included in the program of General Studies.

NOTE: For the student completing the Language Arts field, the requirements here listed supersede and waive the requirement of English 35 and 36, or 135 and 136, in General Studies.

MATHEMATICS (Comprehensive)	30
Required Courses	
Math. 15, 16, 51. Calculus I, II, III	12
Math. 133. Intro. Algebra for Teachers, 3 hr. **or**	
Math. 333, 334. Foundations of Algebra, 4 hr.	3-4
Math. 241. Introduction to Linear Algebra	3
Math. 138. Modern Geometry for Teachers, 3 hr. **or**	
Math. 335, 336. Foundations of Geometry, 4 hr. **or**	
Math. 271. Projective Geometry, 3 hr.	3-4
Approved Electives	9
A minimum of 6 hr. must be selected from list below including:	
1. Statistics	
2. Numerical Analysis	
3. Logic & Sets	
4. Probability	
Math. 28. Finite Mathematics	3
Math. 168. History of Mathematics	3
Math. 181. Introduction to Analysis and Topology	3
Math. 291. Theory of Probability, 3 hr. **or**	
Math. 321. Introduction to Numerical Analysis	3
Math 337, 338. Probability and Statistics, 4 hr.	3-4
Comp. Sci. 1. Introduction to Computer Science	3

MUSIC (Comprehensive)	69-75
Required Courses	
Music 61-68	16
Music 44-47. Instrumental Classes	5-7
Music 171. Instrumentation	
Music 172. Orchestration and Band Arranging	2-4
Music 174. Choral Arranging	2
Music 231, 232. History of Music	6
Music 151, 152. (C&I 167, 168) (Elem. 3; Sec. 3). Music Education	6
Music 51, 52. Conducting	4

	Required Sem. Hr.
Music 100-105	8-10
Music 100. Band	
Music 102. Choral Union	
Music 103. Symphony Orchestra	
Music 105. Choir	
Music 110. Applied Music	22
Instruments 5-16	
Piano 4-16	
Voice 2-16	

(The student completes Level 7 technical proficiency in Music 150 which requires the equivalent of 16 hours of instrument, or piano, or voice study, and the minimum as shown by the first figure in each of the other two Applied areas.)

Approved Electives*

Music 19. Introduction to Opera Theatre	2
Music 115. Chamber Music	1
Music 265. Analysis of Musical Form	3

*Although no electives are included in the requirements for the degree or the certificate, it is recommended that the student take as many of the approved electives as possible.

SAFETY EDUCATION* 16

Required Courses

S.Ed. 70. First Aid and Emergency Allied Services	2
S.Ed. 131. Accident Prevention Control Principles	2
S.Ed. 231. Safety in Motor Transportation Systems	3
S.Ed. 251. Driver and Highway Safety Foundations	3
S.Ed. 254. Teaching Driver and Highway Safety	3
S.Ed. 255. Current Safety Topics and Problems	3

*Approved as a third area of specialization or a second area of specialization with a comprehensive program for grades 7-12.

NOTE: Students with specialization in Safety Education should select Ed. Psych. 260 of their program of Professional Education.

SCHOOL LIBRARIAN** 21

Required Courses*

Lib. Sci. 201. Reference and Bibliography	3
Lib. Sci. 203. Library Materials for Children	3
Lib. Sci. 205. Selection of Books and Related Materials for the Secondary School Library	3
Lib. Sci. 207. Organization and Administration of the Instructional Materials Center in the Secondary School	3
Lib. Sci. 222. Field Practice	3
Lib. Sci. 223. Cataloging and Classification	3
Ed. Psych. 260. Audio-Visual Resources in Education	3

*Student teaching cannot be done in Library Science but must be in another teaching field.
**For certification grades K-12, Lib. Sci. 235 must also be taken.

		Required Sem. Hr.
SOCIAL STUDIES (Comprehensive)		48
History	24	
Required Courses		
Hist. 1, 2. Western Civilization*	6	
Hist. 52. Growth of the American Nation to 1865	3	
Hist. 53. Making of Modern America, 1865-Present	3	
Hist. 153. West Virginia **or**		
Hist. 261. Economic and Social Development of W. Va.	3	
Approved Electives		
May include 9 hr. of European History or 6 hr. of European History and 3 hr. of American History**		9
Hist. 105. Modern Europe 1500-1763	3	
Hist. 106. Modern Europe 1763-1871	3	
Hist. 109. Modern Europe 1871-Present	3	
Hist. 155. American Colonial and Revolutionary Exp.	3	
Hist. 157. The Early Republic, U.S. 1781-1861	3	
Hist. 159. The United States, 1865-1918	3	
Hist. 161. Recent America, U. S. Since 1918	3	
Hist. 201. British Civilization to 1660	3	
Hist. 202. British Civilization Since 1660	3	
Government		6
Pol. Sci. 2. The American Federal System*	3	
One of the following:	3	
Pol. Sci. 1. Elements of Democratic Government		
Pol. Sci. 120. State and Local Government		
Pol. Sci. 160. International Relations		
Pol. Sci. 221. W. Va. Govt. and Administration		
Economics		6
Econ. 51. Principles of Economics*	3	
Econ. 52. Principles of Economics	3	
Sociology		6
Sociol. 1. Introduction to Sociology*	3	
Sociol. 71. Social Problems	3	
Geography		6
Geog. 7. Physical Geography **and/or**	3	
Geog. 8. Human Geography **and/or**	3	
Geog. 109. Economic Geography	3	

*Included in the program of General Studies.
**Students certifying in West Virginia shall include Hist. 153 among their electives.

NOTE: The student who expects to qualify for certification in Social Studies is advised to take the following courses in the program of General Studies: Hist. 1 and 2; economics, sociology, and political science.

	Required Sem. Hr.
SPEECH COMMUNICATION	36
Required Courses	
Speech Com. 31. Basic Speech Improvement°	3
Speech Com. 34. Basic Speech Skills°	3
Speech Com. 80. Introduction to Broadcasting	3
Speech Com. 120. Group Discussion	3
Speech Com. 121. Argumentation and Debate	3
Speech Com. 181. Radio and Television Announcing	3
Speech Com. Elective	3
Drama 50. Oral Interpretation°	3
Drama 75. Acting	3
Drama 100. Stagecraft	3
Drama 180. Directing **or**	
Drama 282. Creative Dramatics	3
SPA 250. Survey of Oral Communication Disorders	3

°Included in the program of General Requirements.

°°Speech Com. 31 and 34 are for students who qualify for certification in the field of Speech. The requirements supersede Speech Com. 3 and 11 in the program of General Studies. Of the drama options, Drama 180 is for teachers certifying for grades 7-12; Drama 282 is for those certifying for grades 5-9.

THE SCIENCES

BIOLOGICAL AND GENERAL SCIENCE (Comprehensive)	57
Required Courses	51
Astron. 106. Descriptive Astronomy	3
Biol. 1, 2. General Biology°	8
Biol. 101. Animals As Organisms (Physical Education majors take Biol. 266)	4
Biol. 102. Plants As Organisms	4
Biol. 103. Population Biology	4
Biol. 104. Cellular & Molecular Biology	4
Chem. 11, 12. General Chemistry	8
Physics 1, 2. General Physics°	8
Geol. 1. Physical Geology°	1
Geol. 2. Physical Geology Lab°	1
Geol. 3. Historical Geology°	3
Geol. 4. Historical Geology Lab°	1
Approved Electives	6
For. 140. West Virginia's Natural Resources and/or any 200-level courses in Biology, other than Biol. 209, Topics and Problems.	

°Included in the program of General Studies.

NOTE: A student who wishes to qualify for a specialization in chemistry, physics or biological science may omit elements of geology and astronomy, but will be required to complete a second specialization.

PHYSICS AND GENERAL SCIENCE (Comprehensive) 47-51

Required Courses

Physics 1, 2. Introductory Physics*	
Physics 9, 10. Physics. Problems **or**	
Physics 11. General Physics*	8-12
Physics 12. Survey of Physics	
Physics 124, 201. Mod. Physics for Engrs. & Spec. Topics	6
Chem. 11, 12. Survey of Chemistry*	8
Geol. 1. Physical Geology*	8
Geol. 2. Physical Geology Lab*	1
Geol. 3. Historical Geology	3
Geol. 4. Historical Geology Lab*	1
Astron. 106. Descriptive Astronomy	3
Biol. 1, 2. General Biology*	8

Approved Electives 6

Physics 113, 114. Introductory Electronics	6
Physics 116. Photography	3
Physics 117. Descriptive Meteorology	3
Physics 221. Optics	3

*Included in the program of General Studies.

NOTE: A student who wishes to qualify for a specialization in chemistry, physics or biological sciences may omit elements of geology and astronomy, but will be required to complete a second specialization.

CHEMISTRY AND GENERAL SCIENCES (Comprehensive) 46-48

Required Courses

Chem. 15, 16. Fundamentals of Chemistry*	8
Chem. 115. Introductory Analytical Chemistry	3
Chem. 131. Organic Chemistry **or**	
Chem. 133. Organic Chemistry	3-4
Chem. 141. Physical Chemistry	4
Geol. 1. Physical Geology*	3
Geol. 2. Physical Geology Laboratory*	1
Geol. 3. Historical Geology*	3
Geol. 4. Historical Geology Laboratory*	1
Astron. 106. Descriptive Astronomy	3
Biol. 1, 2. General Biology*	8
Physics 1, 2. Introduction to Physics*	8

Approved Electives

Geol. 151. Structural Geology	3
Geol. 184. Mineralogy	4

*Included in the program of General Studies.

NOTE: A student who wishes to qualify for a specialization in chemistry, physics or biological sciences may omit elements of geology and astronomy, but will be required to complete a second specialization.

Courses of Instruction*

No courses in Education, except C&I 7, Ed. Psych. 105 and 106, are open to sophomores.

Curriculum and Instruction

C&I

7. **Introduction to Education.** I, II, S. 2 hr. A basic foundation in the current concepts underlying the educational system in the American society. In addition, this course will give the student experience in identifying his values, attitudes and feelings with those of today's community and youth.

100. **Introduction to Elementary Education.** I, II, S. 3 hr. PR: C&I 7 and Ed. Psych. 105. Introduction to elementary education including observation and participation in public schools. Principles of elementary education will be related to principles of learning in Ed. Psych. 106. Analysis of professional problems and procedures will be an integral part of the course. (To be taken concurrently with Ed. Psych. 106, C&I 120 and 130.)

104. **Principles of Teaching in Secondary Schools.** I, II, S. 4 hr. PR: Open only to those who qualify for the student teaching block.

120. **Reading and Language Arts in the Elementary School.** I, II, S. 3 hr. PR: C&I 7, Ed. Psych. 105, and enrollment in the elementary undergraduate program. This course covers instructional practices in all phases of the language arts. (To be taken concurrently with Ed. Psych. 106, C&I 120 and 130.)

126. **Library Science.** I, II. 2 hr. Methods and materials of high school teaching.

127. **Materials and Methods in Public-School Speech and Hearing Therapy.** I, II, S. 2-4 hr. PR: Consent. Includes experiences in Grades 1 to 12.

130. **Mathematics in the Elementary School.** I, II, S. 2 hr. PR: 6 hr. of mathematics, C&I 7 and Ed. Psych. 105, and enrollment in the elementary undergraduate program. Materials and methods with emphasis on the use of problem situations and "discovery" procedures for the development of mathematical ideas appropriate for the elementary school. (To be taken concurrently with Ed. Psych. 106, C&I 100 and 120.)

140. **Science in the Elementary School.** I, II, S. 2 hr. PR: C&I 100 and enrollment in the elementary undergraduate program. Study of modern practices in the teaching of science. (To be taken concurrently with C&I 150 and 187.)

150. **Social Studies in the Elementary School.** I, II, S. 2 hr. PR: C&I 100 and enrollment in the elementary undergraduate program. Study of modern practices in the teaching of social studies. Emphasis on the principles and techniques underlying the community-oriented social processes, foreign culture and geography, and history are developed. (To be taken concurrently with C&I 140 and 187.)

160. **Vocational Agriculture.** I, II. 3 hr. Methods and materials of high school teaching. (Also listed as Agr. Ed. 160.)

165. **Art Education in the Elementary School.** 3 hr. (Also listed as Art 165.)

*C&I 7 and Ed. Psych. 105 are prerequisite to all other courses in Education.

166. **Art Education in the Secondary School.** 3 hr. (Also listed as Art 166.)

167. **Materials and Methods in Elementary-School Music.** I, II. 2 hr. (Also listed as Music 151.)

174. **Physical Education.** I, II. 3 hr. Methods of teaching physical education. (Also listed as P.E. 130.)

175. **Home Economics.** I, II. 2 hr. Methods and materials of high school teaching.

187. **Student Teaching in the Elementary School.** I, II. 4-8 hr. PR: Ed. Psych. 105 and 106, and C&I 7. Open only to those seniors enrolled in the elementary education undergraduate program and who meet the following requirements:

1. Have a minimum grade-point average of 2.25 overall and a minimum grade-point average of 2.0 in:
   a. the subject specialization, three-fourths of which must be completed.
   b. education courses.
2. An applicant for student teaching must submit positive evidence that he or she meets requirements of physical condition and emotional stability necessary for the performance of the duties of a teacher.
3. C&I 140 and 150 must be taken concurrently with student teaching.
4. Admission is by application made prior to February 1 of the preceding year to the Director of Student Teaching.
5. Additional courses may not be taken with the student teaching block.
6. Student teaching will be done in selected centers throughout the state. Therefore, students should be prepared to live off campus if so assigned.
7. Students must avoid employment, social commitments, or housing contracts which would interfere with an off-campus assignment.

188. **Student Teaching.** I, II, S. 4-6 hr. PR: Ed. Psych. 105, 106, C&I 7, and Special Methods in subject area specialization. Open only to seniors and graduate students, regularly enrolled in the University, who meet the following requirements: (Also listed as Agricultural Education 188.)

1. Completion of 75 per cent of the hours required in each of two teaching fields, or one comprehensive field, with a minimum grade-point average of 2.0 (C) in the teaching fields and in Education and a minimum overall grade-point average of 2.25.*
2. An applicant for student teaching must submit positive evidence that he (or she) meets the requirements of physical condition and emotional stability necessary for the performance of the duties of a teacher. Such evidence must come from the University Health Service on a form used by the Division of Education.
3. This course must be taken concurrently with C&I 104.
4. Admission is by application made by February 1 of the preceding year to the Director of Student Teaching.
5. The student is responsible for maintaining knowledge of his eligibility. He should check regularly each semester with his adviser for relevant information.

*All work taken within the area of a teaching field will be used in the computation of the grade-point average for that field regardless of whether the work is required for the teaching field.

6. Students with no teaching experience are expected to take this course during the academic year.
7. Additional courses may not be taken with the student teaching block.
8. Student teaching will be done in centers throughout the state, so students should be prepared to live off campus if so assigned.
9. Students must avoid employment, social commitments, or housing contracts which would interfere with an off-campus assignment.

189. **Student Teaching in Elementary-School Music.** I, II. 3 hr. Open to seniors who have completed 27 semester hours in music and 7 semester hours in education with a grade-point average of 2.0 in each and an overall grade-point average of 2.25. Observation and practice of teaching music to pupils in grades 1 through 6.

190. **Student Teaching in Secondary-School Music.** I, II. 4 hr. PR: Same as C&I 188, except in hours credit needed and Music 52, 152, and 232.

205. **The Junior High School.** I, II. 2 hr. PR: Consent. Developing philosophy, program, and practices of the junior high school.

210. **Early Childhood Education.** SII. 3 hr. PR: CDFR 141, 142, C&I 100. An examination of the role that early childhood education plays in the development of the child. Attention is given to the scope, content, and nature of programs for young children as well as developing the knowledge, skills, and attitudes necessary for working in such programs. Students will be given opportunities to observe and participate in early childhood programs and to engage in research at this level.

211. **Early Childhood Education.** SII. 3 hr. PR: CDFR 142, 144, C&I 210. Continuation of C&I 210.

237. **Mathematics in the Junior High School and Middle School.** SII. 3 hr. PR: 6 hr. of College mathematics or consent. Study of the teaching of mathematics in the junior high school or middle school; application of the mathematics content to teaching; instructional techniques and materials.

267. **The Music Education Program.** S. 3 hr. PR: Consent. Organization and administration of the complete Music Education program for grades 1-12.

278. **Vocational Home Economics in Secondary Schools.** I. 3 hr. PR: Ed. Psych. 106, 25 hr. in home economics (Family Resources).

279. **Organization Administration of Physical Education.** 3 hr. (Also listed as P.E. 192.)

280. **Special Problems and Workshops.** I, II, S. 2-4 hr. PR: 14 hr. in education. To take care of credits for special workshops and short intensive unit courses on methods, supervision, and other special topics. Maximum of 8 semester hours may be applied toward the Master's degree, of which no more than 6 semester hours will be in Extension.

287. **Student Teaching Clinical Experience in Elementary or Secondary Education.** I, II, S. 2-4 hr. PR: Consent. Advanced course in student teaching, stressing clinical procedures in classroom learning problems.

288. **Clinical Practices in Public-School Speech and Hearing Therapy.** I, II, S. 2-8 hr. PR: Consent. Includes experience in grades 1 to 12. This course meets the requirements of SPA 282 and 283.

Educational Psychology

Ed. Psych.

105. **Human Development and Learning.** I, II, S. 3 hr. Introductory course in the professional sequence of teacher education. Emphasizes competencies in applying principles of learning and measurement in classroom instruction.

106. **Human Development and Learning.** I, II, S. 3 hr. PR: Ed. Psych. 105. Continuation of the professional sequence in teacher education. Emphasis on development, standardized measurement, and classroom management.

231. **Sampling Methods.** I. 3 hr. PR: An introductory course in statistics. Methods of sampling from finite and infinite populations, choice of sampling unit, sample survey design, estimation of confidence limits and optimum sample size, and single and multi-stage sampling procedures. (Equiv. to Statistics 231.)

260. **Audio-Visual Resources for Instruction.** I, II, S. 3 hr. A survey of many types of materials available for teaching. Multisensory techniques, sources of materials, and practical classroom utilization are considered. Laboratory period per week is arranged.

Health Education

Health Ed.

2. **Personal and Community Health.** I, II. 2 hr. Phases of healthful living which should be understood by all college students. Special emphasis on aspects of personal health.

101. **The Elementary School Health Program.** I, II, S. 2 hr. PR: Ed. Psych. 105. Study and analysis of the health program which takes place in the school or through the efforts of school personnel; the organization, educational aspects, and personnel relationships involved in school health services, healthful school living, and health education. Required for teacher certification.

102. **The Secondary School Health Program.** I, II, S. 2 hr. PR: Ed. Psych. 105. Study and analysis of the health program which takes place in the school or through the effects of school personnel; the organization, educational aspects, and personnel relationships involved in school health services, healthful school living, and health education. Required teacher certification.

Industrial Arts

No new students are being accepted in the undergraduate Industrial Arts program at this time. An extensive curriculum development project is being undertaken for the purpose of establishing a more modern and relevant curriculum model of Industrial Arts teacher education.

Division of Family Resources

The Division of Family Resources provides a program for women and men interested in obtaining undergraduate professional preparation in the broad field of home economics. The courses provide students opportunity to study the environment of man, particularly his food, clothing and shelter, and the relationship of man to his environment. The focus is on human interaction and its consequences within the framework of the social institution of the family.

Students enroll who are interested in numerous career opportunities in any of these areas:

- —child development, nursery education, early childhood education, family life education, child welfare, family service occupation, and other community service fields.
- —management and effective use of family financial and human resources.
- —design and use of dwellings, interior design, and design and use of products, furnishings, and equipment for the home.
- —the textile and fiber industry, fashion, and fashion merchandising.
- —food production, processing, and institutional food practices.
- —human nutrition, nutrition education, and dietetics.
- —journalism, particularly in the areas of food, fashion, and home service.
- —teaching in elementary, junior high school, or secondary school programs in family life education, foods and nutrition, clothing and textiles, and consumer education.
- —large industrial organizations whose major products are food, household equipment, or educational information and service directed toward the consumer.

Students prepare for these career opportunities by enrolling in the Division of Family Resources. They may work with children, adolescents, adults, or total family units; in schools, small businesses or large corporations, public utility companies, and various government organizations; in their own community, in any part of the United States, or in a foreign country. The demand has never been greater for the kind of professional services that the home economist has to offer.

The Division provides not only for lectures but also for a variety of kinds of laboratory experiences and selected field work in different settings.

The need to educate competent and informed citizens and family members has never been more urgent. The Division regularly attracts a large number of students from various departments in the University who enroll in courses to increase the scope of their knowledge in family relations and child development, foods and nutrition, textiles and clothing, housing and design, and family economics and management. Home economics has the longest tradition of any field for interest in the education of competent and informed consumers and family members.

Student Organizations

Home Economics Club—open to all majors.
West Virginia Home Economics Association—open to all majors.
American Home Economics Association—open to all majors.
Phi Upsilon Omicron—national professional fraternity.
Omicron Nu—national honorary society.

Requirements for the Degree

Students have the choice of seven options toward a degree in home economics: social science emphasis, physical science emphasis, art emphasis, journalism emphasis, dietetics emphasis, home economics education, or general emphasis. The Bachelor of Science degree is granted with a minimum total of 128 hours, including a minimum of 58 upper-division hours.

Where written consent is required for courses offered by the Division of Family Resources it may be given only by the instructor or the Division Director.

Minimum hours in Family Resources	36
Total hours in other areas	80
Electives	12
Grand Total	128

Required Courses

	Hr.
I. University Core Curriculum	
English Composition	6
Physical Education	2
Core Groups A, B, and C	36
Total	44
II. Family Resources Professional Core	
1. Child Development and Family Relations 144	3
2. Textiles and Clothing 22 *or* 121	3
3. Nutrition 71 *or* 175	3
4. Home Management and Family Economics 161 *or* 165	3
5. Housing and Design 31	3
Total	15
III. Options	
a. Social Science Emphasis	
1. Early Childhood Education*	
(a) Education, Library Science and Speech Com.	16
(b) Restricted Child Development and Family Relations and Home Management and Family Economics electives	14
(c) Electives	39
Total	69

*This is not a certification program. For further information consult Director of the Division of Family Resources.

2. Social Science
   (a) Restricted electives in general studies 15
   (b) Restricted electives in Child Development and Family Relations and Home Management and Family Economics 14
   (c) Electives 40
   Total 69

3. Social Work
   (a) Social Work 15-24
   (b) Restricted electives in Family Resources 14
   (c) Restricted electives in Social Science 9
   (d) Electives 22-31
   Total 69

b. Physical Science Emphasis
1. Additional courses in physical science, work in at least two fields 12
   a. Biology, bacteriology, genetics
   b. Chemistry
   c. Mathematics, statistics, physics
2. Additional courses in Foods and Nutrition 15
3. Speech Communication 3
4. Electives 39
   Total 69

c. Art Emphasis°
1. Interior Design
   (a) Additional required courses in Art, Marketing, Business, Journalism and Speech Com. 29
   (b) Additional required courses in Housing and Design and Textiles and Clothing 24
   (c) Restricted electives 16
   Total 69

2. Retailing°°
   (a) Additional required courses in general studies 12
   (b) Additional required courses in Textiles and Clothing 18
   (c) Restricted electives in general studies 15
   (d) Electives 24
   Total 69

°The following courses in art are specifically required: Art 11, 105, 106, 121, 211, and 260
°°Any 6 semester hours are to be selected from Art 11, 121, 105, and 106.

d. Journalism Emphasis

1. Additional courses in Family Resources	15
2. Journalism courses	21
3. Additional courses from University Core B	6
4. Family Resources electives	6
5. General electives	21
Total	69

e. Dietetics Emphasis

1. Additional courses in physical sciences	16
2. Additional courses in Foods and Institution Administration and Nutrition	29
3. Accounting 51 or Statistics 101, Psychology 101, Speech Com. 3, and Educational Psychology 106	12
4. Electives	12
Total	69

f. Home Economics Education Emphasis (Teaching)—Students wishing to obtain a certificate in vocational home economics must take certain specified courses under the WVU Core Curriculum and must have at least 8 hours in each of the five subject-matter areas in the Division.

g. General Emphasis

1. One additional 3-hour course in each area plus 6 hours of elective in Home Economics	21
2. Restricted electives	48
Total	69

Home Economics Education

H. E. Ed.

278. **Vocational Home Economics.** I, II. 3 hr. PR: Senior standing or written consent. To develop an understanding of federal vocational legislation in order to enable an individual to develop program proposals and to implement programs in the following areas of vocational education: (a) Consumer and Homemaking, (b) Career oriented, (c) Occupational, (d) Adult, and (e) Ancillary Services.

Textiles and Clothing

TC

22. **Principles of Clothing Construction.** I, II. 3 hr. Basic principles of clothing construction including pattern alteration and fitting. (Lab fee $5.00.)

27. **Textiles for Consumers.** I, II. 3 hr. Presents a survey of traditional background information and the new developments in the textile field. Special emphasis is given to the development of raw materials into finished consumers' goods.

121. **Clothing for the Family.** I, II. 3 hr. Clothing for the family in relation to social, psychological, and economic factors including a study of the clothing industry, trends, and cultural significance. Field trip included.

122. **Tailoring.** I, II. 3 hr. PR: TC 22, 27. Tailoring of suits and coats. Emphasis placed on professional techniques, advanced fitting and construction of garments. Second garment constructed by fast method techniques. (Lab fee $5.00.)

123. **Costume Design.** II. 3 hr. PR: TC 22, 27. Techniques of figure and fashion drawing. Designing for individuals of various types and ages. Some history of costume included.

224. **Advanced Clothing Construction.** I. 3 hr. PR: TC 123 or consent. Offers opportunity for creative expression and for understanding of pattern design through flat pattern and draping methods. Costumes are designed and constructed by use of both of these techniques.(Lab fee $5.00.)

227. **Advanced Textiles.** I. 3 hr. PR: TC 27. Comparative characteristics of all textile fibers are presented. Physical and chemical properties are explained with reference to fiber morphology and/or manufacturing processes. Textile fiber products legislation is reviewed. Physical and chemical laboratory experience is provided.

Home Management; Family Economics

HMFE

160. **Communication of Consumer Information.** I, II. 2 hr. PR: Minimum of 3 hr. in each of four areas of home economics or consent. Techniques of communicating ideas and information relative to goods and services available to the consumer. Emphasis upon demonstration techniques.

161. **Family Economics.** I, II. 3 hr. Management of the family's money resources. Consideration of the economic problems of families, of planned spending and saving, and of the role of the consumer.

165. **Home Management: Principles and Application.** I, II. 3 hr. PR: Upper-division standing. Study and application of management in a variety of situations faced by the family with opportunity to integrate knowledge from other courses.

166. **Home Management: Residence Laboratory.** I, II. 1-3 hr. PR: HMFE 165. Residence laboratory in home management principles and practices.

167. **Household Equipment.** I, II. 3 hr. Selection, arrangement, use and care of equipment for various situations and for different income levels. Lecture, laboratory, and discussion. (Lab fee $5.00.)

261. **Consumer Economics.** II. 3 hr. PR: Econ. 51 or HMFE 161, or consent. Course designed to help students understand the role of consumer in our economy. Involves the study of research methods and techniques being used to identify, understand, and solve consumer problems.

Housing and Design

HD

31. **Introduction to Design.** I, II. 3 hr. The use of the design elements and the application of design principles to stimulate imagination and creative ability

and to develop discrimination judgment in selection and arrangement of materials used for the individual and the home.

33. **Housing Design.** I, II. 3 hr. PR: HD 31 or consent. Housing and home planning as they relate to family living. Selection, arrangement, and use of the interior and exterior space for activities carried on, in, and around the home. (Lab fee $5.00.)

133. **Interior Design I.** I, II. 3 hr. PR: HD 33 or consent. The aesthetic and practical aspects of coordinating the furnishings, background, accessories, lighting, and space of a house for family living. (Lab fee $5.00.)

233. **Interior Design II.** I, II. 3 hr. PR: 9 hr. HD courses. Technical and design information necessary to comprehend and function within the contemporary home furnishings market.

Child Development; Family Relations

CDFR

141. **Child Development I.** I and II. 3 hr. PR: Psych. 1, or Ed. 105, or consent. An introduction to various theories of human development. Areas emphasized are: emotional, social, and cognitive. Contemporary and traditional theories studied. Laboratory experience of observing in pre-primary centers.

142. **Child Development II.** I, II. 3 hr. PR: Psych. 1 or Educ. Psych. 105 or consent. Principles of development during childhood including physical, psychological, and social factors affecting behavior. Observation and participation in the University Nursery School.

144. **Introduction to Marriage and the Family.** I, II. 3 hr. Introductory course in the study of marriage and the family. Attention is placed particularly on mate selection, the interplay of social roles in family relations, and problems of decision-making and adjustment arising out of the demands of the contemporary social setting.

145. **Infant Development.** I, II. 3 hr. Developmental characteristics and issues during the prenatal period and the first eighteen months with implications for guidance and care.

244. **Family and Individual in Community.** I, S. 3 hr. PR: One course in the family, or sociology, or consent. Social psychological analysis of the individual in the family and in other social systems. Involves the study of the role relationships, community processes and attitudes and values as they affect the behavior of the individual.

245. **Family Development.** II, S. 3 hr. PR: CDFR 144 or consent. A course designed to increase knowledge and understanding of comparative family patterns through the use of cross-cultural and historical materials. Intensive study of family development in contemporary United States with special attention to social class differences and the use of the life cycle and developmental task concepts as analytic tools.

246. **Adolescent Development.** II. 3 hr. An investigation of the adolescent in contemporary American culture, including normative physical, social, and personality development; and relationships within various typical social settings (e.g., family, school, community, peer group).

284. **Special Topics in Child Development.** I, S. 1-4 hr. per sem. PR: Written consent.

288. **Special Topics in Family Relations.** II, S. 1-4 hr. per sem. PR: Written consent.

Foods; Institution Administration

FIA

55. **Food Principles and Practices.** I, II. 3 hr. PR: 8 hr. of a laboratory science. Basic principles of food selection, care and preparation. Emphasis is placed on the chemical and physical properties of foods and reactions which occur during processing. (Lab fee $10.00.)

151. **Meal Management.** I, II. 3 hr. PR: FIA 55 or consent. Selection and purchase of foods; planning, preparing, and serving meals with emphasis on time, energy, and money management (Lab fee $15.00.)

153. **Institutional Food Production Systems Management.** II. 3 hr. PR: FIA 55, 151. Application of principles to preparation of food in large quantities. Use of standardized formulae, calculation of costs, and use of institution equipment. Field trip included. Offered alternate odd years.

154. **Institution Food Procurement.** I. 3 hr. PR: FIA 153. Producing areas, distribution of food products, specifications, storage, and food practices in quantity buying. Observation in local wholesale markets, warehouses, and storage units. Offered in alternate odd years. Tour of market facilities in Pittsburgh area required.

158. **Institution Organization and Management.** II. 3 hr. PR: FIA 153. Principles of organization and management of food service. Field trip included. Offered alternate even years.

255. **Experimental Foods.** II. 3 hr. PR: FIA 55, Chem. 131, or consent. The study and experimentation with factors involved in food processing under various conditions. Offered alternate odd years. (Lab fee $10.00.)

258. **Laboratory Practice in Institution Management.** I, II. 3 hr. PR: FIA 158 and consent. Experience under supervision in planning, preparing and serving food in an institution. Selection of place and type of experience to be determined by needs of students.

Nutrition

NTR

71. **Introduction to Nutrition.** I, II. 3 hr. Essentials of adequate diet; applications are made with particular reference to needs of college students.

175. **Food and People.** I. 3 hr. Study of the total significance of food to man and the ecology of food-behavior seen through the historical, cultural, economic, and physiological perspectives.

271. **Human Nutrition.** I. 3 hr. PR: NTR 71, biochemistry, physiology. The role of food nutrients in the physiological and biochemical processes of the body; nutritional needs of healthy individuals under ordinary conditions and in periods of physiologic stress. Offered alternate even years.

273. **Family and Community Nutrition.** II. 3 hr. PR: Consent. Special emphasis is given to nutritional status of the individual and family in the community. Students study nutritional problems and work toward their solutions through fieldwork.

274. **Diet Therapy.** II. 3 hr. PR: NTR 271, Biol. 266. Adaptations of normal diet for diseases whose prevention or treatment is largely influenced by diet. Offered in alternate odd years.

Family Resources

FR

282. **Seminar in Clothing or Textiles.** I, II, S. 1-4 hr. per sem., max., 9 hr. Critical examination of significant contemporary issues in the area of clothing or textiles.

283. **Seminar in Housing and Design.** I, II, S. 1-4 hr. per sem., max., 9 hr. PR: Written consent and 12 hr. HD courses. Critical examination of significant contemporary issues in the areas of housing or design.

285. **Seminar in Food and/or Institution Administration.** I, II, S. 1-4 hr. per sem., max., 9 hr. PR: Written consent. Critical examination of significant contemporary issues in the area of foods and/or institution administration.

286. **Seminar in Home Management or Family Economics.** I, II, S. 1-4 hr. per sem., max., 9 hr. PR: Written consent. Critical examination of significant contemporary issues in the area of home management or family economics.

287. **Seminar in Nutrition.** I, II, S. 1-4 hr. per sem., max., 9 hr. PR: Written consent. Critical examination of significant contemporary issues in the area of nutrition.

School of Journalism

Most people—and especially young people—want to do something with their lives, and for their fellowmen. What better pathway is there to this goal than to become a journalist? The responsibilities and power of the men who control the mass media in our society are greater today then ever before.

Editors, producers, advertising executives, and public relations practitioners make many decisions every day that directly affect the man in the street. They are the people who provide the information, interpretation, and opinion that can move governments. They are the people who play a major role in deciding how you'll vote, what brand of toothpaste you use, and how you view the major institutions of our society.

The function of the School of Journalism at WVU is to offer appropriate education to students who will become responsible communicators. Right now, many of the more than 1,000 graduates of the School are using the broad education and training they received to revolutionize the world of communications.

WVU graduates are now covering important news events throughout the world. They are covering the seething unrest of the urban ghetto for *Time*. They are managing huge accounts in advertising agencies like J. Walter Thompson and Carl Byoir and Associates in New York. They are directing the public relations programs of industrial giants such as Fairchild Camera. And they are university professors, businessmen, army officers, school principals, and housewives. Most are concerned and informed citizens—the product of a liberal arts background as well as an intense professional preparation.

The approximately 500 students currently enrolled in the School of Journalism are beneficiaries of a program that stretches back as far as 1915, when a two-hour course in news writing was first offered in the Department of English. By 1927 West Virginia had taken a position of leadership in journalism education by establishing a full professional curriculum in a separate department of journalism. The department became a School of Journalism in 1939 with an administrative status similar to that of other schools and colleges within WVU. It was then one of only six journalism schools in the United States to achieve this independent status.

The study of journalism—once limited to vocational training of newspaper reporters—has become much more. It is now aimed at the gamut of ways in which man communicates with his fellowman, with emphasis on ethics and responsibility in the broad study of mass communication and society.

Such an education must be first the study of literature, economics, political science, psychology, sociology, the natural sciences, and history, and the huge range of subjects of social concern. Also, it must be the study of the ways of communicating those ideas most effectively.

A journalism education today at WVU involves more than learning how to write and edit news stories or broadcast documentaries or to prepare creative

advertisements. It involves the study of substantive issues that will need to be communicated in the next fifty years as well as those which have already occurred.

When a student grasps the fundamentals of the liberal arts tradition, he must go on to acquire more than the ability to communicate within the substantive framework. He must acquire the ethical awareness demanded by the profession. His work has impact far beyond that of most occupations, and it should require standards of integrity and fairness equal to the increasingly complex problems of our time.

A successful public relations man or advertising executive must know where ethical advocacy of a product ends and hucksterism begins. The photographer-journalist and the editor must know where the presentation of fact ends and fabrication begins. It is in this realm, as well as that of substantive course work, that a faculty of high quality plays a major role.

The quality of any school depends heavily on the quality of its faculty.

When you enroll in the School of Journalism, you are guided by a faculty of twelve full-time professors and three part-time professors who represent more than 200 years of cumulative journalsitic experience.

It is a faculty which represents the diversity of the School itself. The backgrounds and education of the teaching staff include professional experience with major magazines, newspapers, the wire services, radio and television, public relations firms and advertising agencies.

A communication faculty must have a deep commitment to scholarly achievement. Many faculty members have earned distinction in the learned societies in their fields.

A number of the professors have published research products in scholarly journals such as the *Columbia Journalism Review*, *Journalism Quarterly*, *Journalism Educator*, and *Public Relations Journal*.

Though committed to scholarly attainment, the faculty places even more emphasis on its most important function: teaching. Student-faculty rapport is excellent and virtually all professors maintain an open-door policy—they are available to their students at almost any time.

At a time when some students are saying they can't trust anyone over 30, the School has a number of young faculty members. Those over the arbitrary cut-off of age 30 have earned the respect of their students through dedication and through professional and scholarly attainment, as well as through their willingness to give time and individual attention to their students.

Professional Opportunities

The School of Journalism recently has moved to expand the variety of opportunities for its students to apply the theories learned in the classroom to the cold, hard professional world. The philosophy that permeates the School is that theory is more meaningful if applied in the atmosphere faced by the working newsman or copywriter. Thus, students who are studying the problems of newspapers influencing or prejudicing justice in the courtroom go beyond the textbook and actually cover court cases and judicial proceedings and write news stories based on what they have learned.

The School has arranged an internship program for news-editorial students with the two Morgantown daily newspapers, the *Dominion-News* and the *Morgantown Post*. During the semester, students enrolled in reporting and editing classes write and edit news stories as part of their class work and receive credit for this.

In addition, the School maintains a working relationship with the *Daily Athenaeum*, the award-winning student newspaper at WVU. Students enrolled in news-editorial classes may elect to work on the *Daily Athenaeum* under the supervision of a professor as one segment of their course work. Others serve as reporters and editors for the paper as an extra-curricular activity.

The *Daily Athenaeum*, winner of Sigma Delta Chi, Hearst Foundation, Associated Collegiate Press, and *Nashville Tennessean* awards for excellence, concentrates on covering the University and the community with interpretive writing in addition to spot news. Students edit local reporters' copy and prepare state, national, and international wire copy from Associated Press and United Press International.

Advanced students in photo-journalism may receive practical experience as photographers for the *Daily Athenaeum*, as local stringers for Associated Press, and as part-time photographers for the WVU Office of Publications.

Advertising students find opportunities for practical experience by selling advertisements and servicing accounts for the *Daily Athenaeum* and other campus publications, as well as by handling the paper's other business matters.

Students directing their studies toward production have full opportunity to become involved in both letterpress and offset projects in typography and production laboratories. Those wishing to get involved in newspaper production have ample opportunity to become members of the *Daily Athenaeum* production staff, learning how to run the latest cold-type production equipment, as well as the intricacies of newspaper paste-up.

Public relations students generate and execute projects aimed at identifying and solving communications bottlenecks between local and state-wide organizations and their publics.

Because students write, edit, sell ads, and even do the typesetting and page paste-up on the *Daily Athenaeum*, any facet of journalistic life can be experienced if a student so desires.

The School also operates a summer program that places superior students in jobs with major newspapers, magazines, radio stations, television stations, and industries for about ten weeks.

Broadcast news students also have a number of opportunities to gain professional experience, including the preparation of newscasts for local radio stations and special public affairs shows for the local cablevision channel.

The emphasis on broadcasting and the electronic media is growing rapidly. With the University's educational television station, WWVU-TV, some students work part-time to get practical experience in this medium. It involves mastering the principles of documentary production and basic film editing. Students in radio courses are responsible for gathering and writing news for news programs.

Fred Friendly, former president of CBS News and now a journalism professor at Columbia University, has said that television is making so much money doing its worst that it can't afford to do its best. One of the purposes

of the broadcast program at WVU will be to set, in some small way, a standard of quality by which commercial networks can be judged.

Standing Committees

*Academic Standards:** R. L. Hopkins (*Chairman*); P. A. Atkins, F. M. Kearns; and Dean Stewart, ex officio.

*Scholarships:** H. W. Elwood (*Chairman*); W. R. Summers, Jr.; and Dean Stewart, ex officio.

*Graduate Studies:** E. C. Smith (*Chairman*); P. A. Atkins, C. F. Cremer, H. P. McCartney, H. E. Straus; and Dean Stewart, ex officio.

Library Acquisitions: C. F. Cremer (*Chairman*); H. W. Elwood, R. M. Ours, E. C. Smith; and Dean Stewart, ex officio.

Executive: Dean Stewart (*Chairman*); P. A. Atkins, H. P. McCartney, and W. R. Summers, Jr.

*This committee has a student representative.

Accreditation

The School of Journalism is accredited by the American Council on Education for Journalism for the Advertising and News-Editorial sequences. A.C.E.J. approval is held by sixty colleges and universities in the United States.

The quality of the School's program also has been recognized by memberships in the American Association of Schools and Departments of Journalism and the American Society of Journalism School Administrators.

Professional Relations

Almost from the inception of journalism instruction at West Virginia University in the early 1920s, there has been a close and continuing relationship with the professionals among the mass media.

The earliest associations were with the West Virginia Publishers Association and the West Virginia State Newspaper Council, and now the same relationship exists with the West Virginia Press Association, the successor to the two former groups. Moreover, close professional relationships have been expanded to include the West Virginia Broadcasters Association and an adjunct to the WVPA, the West Virginia Publications and Public Relations Section.

These groups have provided continued support in seeking better facilities for journalism, and they have provided scholarships and financial support for Journalism Week.

In turn, the School of Journalism has provided new services to the professionals in recent years. A number of regional advertising seminars have been conducted for newspaper publishers and retail merchants, and additional workshops on newswriting have been conducted for stringer-correspondents of weekly newspapers. Also, the School has provided science writing symposia and seminars on Appalachia and interpretive vs. advocacy reporting for practicing newsmen, and it has jointly worked with the P&PR Section of the WVPA in establishing seminars. Additionally, the School has assisted the teachers of journalism by holding summer workshops.

Typewriting

Before or soon after entering WVU, a student planning to major in journalism should learn the touch system of typing. From the beginning, all students in writing courses are expected to submit copy in neat, typewritten form.

Admissions

To be admitted to the School of Journalism, a student meets these requirements:

1. Must have completed 58 hours with an overall grade-point average of 2.0.
2. Must have a 2.5 overall grade-point average if he already has completed 75 hours.
3. Must be approved by a faculty-student interviewing and counseling committee.
4. Must submit a statement to the chairman of the interviewing committee in which he outlines why he wants to major in a specific area of journalism.
5. Must agree to complete at least 45 hours in the School of Journalism.
6. Must complete Journalism 18, or equivalent, with at least a C grade prior to admission to the School.

Proficiency in English

High competence in writing is emphasized. A student who proposes to major in journalism must achieve at least a 2.0 average or higher in English 1 and 2.

Journalism Organizations

Students usually find that a part of their learning does not come from a classroom lecture or an assignment. It comes instead from the challenge and intellectual stimulation provided by fellow students.

There are a number of organizations affiliated with the School which provide the opportunity not only for honor and recognition, but also for fellowship and education. They are:

ADS, professional advertising fraternity.

Kappa Tau Alpha, national scholastic honorary for students with exceptional academic records in journalism.

Public Relations Student Society of America, national public relations professional organization.

Sigma Delta Chi, professional journalistic society for men and women.

Theta Sigma Phi, professional journalism honorary for women.

Job Placement

The School makes every effort possible to assist its graduates in finding desirable positions. It attempts to act as a placement clearinghouse for current and past graduates.

Representatives of newspapers, magazines, broadcast, and advertising media visit the campus each year to interview seniors, and they frequently call on the School of Journalism to provide applicants for their respective openings.

Bachelor of Science in Journalism

A candidate who has satisfied all general requirements of the University and has met the requirements of the School of Journalism will be recommended for the degree of Bachelor of Science in Journalism or Bachelor of Science in Journalism Education, provided the combined number of his credits acquired as a prejournalism student and as a regularly enrolled journalism major totals no fewer than 128. This total will not count non-translated courses from other colleges, any course repeated more than one time (such as Music 102) or Mathematics 2.

In line with the national accreditation council and the School's philosophy on the ratio of professional journalism courses to courses in liberal arts, a degree candidate will take approximately one-fourth of his total hours in journalism. The minimum number of journalism hours will be 30 and the maximum number ordinarily will be 33.

No fewer than 40 semester credits shall be obtained in courses numbered between 100 and 400. A student must complete at least 45 hours of work after he is admitted to the School of Journalism.

It is possible for a student to pursue another degree concurrently, but the candidate must work out his programs with the deans of the two colleges involved.

A student within 10 hours of graduation in his last semester may elect to take one or more courses for graduate credit. However, he must consult with his adviser and petition the Graduate School.

In the student's final semester, he will be expected to provide a small head and shoulders photo and information about his future employment for School of Journalism records.

Independent Study/Waivers

The journalism faculty encourages the taking of courses by examination and through independent study, when the student's background and the nature of the courses lend themselves to such arrangement. The method of examination can be appropriate when students have in some way other than by class attendance learned the course content. Independent study may be undertaken in some courses with the consent and supervision of the professor. Occasionally a student may receive the Dean's permission to waive a course, though this normally is done only in unusual cases.

Scholastic Requirements

To be eligible for graduation, a student must earn a minimum cumulative average of 2.0; concurrently his journalism average and his average in his minor field must be at least 2.0.

No student will be recommended for the degree unless he has shown to the satisfaction of the faculty that he possesses abilities and qualities which give promise that he can do adequate work in professional journalism.

Probation/Full-Time Load

A student on probation shall not take more than 15 hours of course work in a semester, and the Committee on Academic Standards may require that he not take more than 12. Also, no student may enroll for more than 18 hours in a single semester without petitioning the Committee on Academic Standards.

The Minor Field

To meet the requirements for a minor, a student must earn at least 15 semester credits in a subject other than journalism with no more than three hours in courses numbered under 100. Courses at 100 level or higher, even when they can be taken more than once, will be counted only one time (except Journ. 141). For students pursuing two minors simultaneously, the requirement in each area is at least 12 semester credits, of which no more than three hours can be numbered under 100. A student should consult his adviser about a minor.

Students from other major fields of study are permitted to minor in journalism.

Withdrawals from Class or University

All students enrolled in journalism courses may withdraw from a course through the first five weeks with a grade of W. After that date, a student may withdraw *only* if he has the approval of his college's Committee on Academic Standards, and then he will be awarded a grade of W or WU.

Journalism majors who withdraw from the University after the ninth week of a semester will be automatically suspended from the School of Journalism for a minimum of one semester (not including a summer term). If a late withdrawal results from illness, the student must present a written excuse from a physician at the time of withdrawal to avoid this automatic suspension.

Faculty

Guy H. Stewart, Ph.D. (U. Ill.), *Dean of the School of Journalism and Professor of Journalism.*
Paul A. Atkins, M.S. (U. Va.), *Professor of Journalism.*
Donovan H. Bond, M.A. (WVU), *Professor of Journalism.*
Charles F. Cremer, Ph.D. (U. Iowa), *Associate Professor of Journalism.*
Harry W. Elwood, M.S. (Northwestern U.), *Assistant Professor of Journalism.*
Harry W. Ernst, M.S.J. (Northwestern U.), *Assistant Professor of Journalism.*
Richard L. Hopkins, M.S.J. (WVU), *Associate Professor of Journalism.*
Frank M. Kearns, B.A. (WVU), *Benedum Professor of Journalism.*
Hunter P. McCartney, Ph.D. (U. Penn.), *Professor of Journalism.*
Robert M. Ours, M.A. (U. Va.), *Assistant Professor of Journalism.*
Edward C. Smith, Ph.D. (U. Iowa), *Associate Professor of Journalism.*
Harley E. Straus, M.A. (U. Ore.), *Assistant Professor of Journalism.*
William R. Summers, Jr., M.A. (U. Mo.), *Professor of Journalism.*
C. Gregory Van Camp, M.S.J. (WVU), *Assistant Professor of Journalism.*
Paul G. Yeazell, M.A. (U. Ariz.), *Assistant Professor of Journalism.*

NEWS/EDITORIAL

This curriculum is devoted to teaching fact-gathering, news and feature writing, and the various skills of editing.

The sequence stemmed from the first courses offered in journalism at WVU. Over the years it has expanded and been improved and today is fully accredited by the American Council on Education for Journalism (ACEJ), known throughout the country for its recognition of superior journalism programs. Also, the School is recognized by membership in the American Society of Journalism School Administrators and the American Association of Schools and Departments of Journalism.

Most news-editorial graduates have found employment on newspapers, magazines, and other publications or with the international press associations. This, in part, is because they have received excellent preparation for such careers in print media by working on the staff of the *Daily Athenaeum* and other newspapers.

Other graduates, however, have gone into broadcasting or public relations or hold writing and editing positions in the professions, scientific fields, business, industry, and government.

News-editorial students most frequently minor in political science, history, or English. But it is becoming more common for them to select such areas as sociology, psychology, speech communication, and drama.

First Year		Second Year	
Journalism 1	2	Journalism 19	3
Journalism 18	3	Journalism 120 (10)	3
English 1	3	History	6
English 2	3	Economics/Social Science	6
Humanities	6	English elective	3
Science	8	Science	6
Core A elective	3	Political Science	3
Political Science	3	Core A elective	3
Physical Education	2		

Third Year		Fourth Year	
Journalism 118	3	Journalism 227*	3
Journalism 128*	3	Journalism 228*	3
Minor (upper division)	6	Journalism 230**	3
Electives	18	Journalism 299	3
English elective	3	Minor (upper division)	6
		Electives	10-13
		Journalism electives	3-8

*Students may elect two of these courses: Journ. 128, 227, 228.
**Students may elect Journ. 220 as a substitute.

Approved journalism electives: Journ. 80, 108, 110, 111, 113, 130, 141, 182, 183, 220.

ADVERTISING

The curriculum is designed to prepare students for careers in the creation, sales, management, and production of advertising.

Journalism 10 and 113 are the basic courses in the sequence. Everything else in advertising instruction is founded on these courses.

Students develop two specializations in advertising in the junior and senior years. The specialization areas are: Advertising Copy (Journ. 251 and 286), Photography (Journ. 120 and 131), Broadcast Advertising (Journ. 189 and 286), News-Editorial (Journ. 108 and 228), Advertising Sales and Media (Journ. 203 and 204), Graphics and Production (Journ. 110 and 210), and Public Relations (Journ. 111 and 112).

The minor field is subject to the approval of the adviser. Some of the approved minors are marketing, economics, management, finance, business law, psychology, and speech communication. Fifteen credits, with no more than three hours in courses numbered under 100, are required for the minor. A second minor is optional.

Persons who are interested in practical application of advertising production problems should consider working part-time in the offset production plant of the *Daily Athenaeum* in addition to electing Journalism 210.

Advertising is an important part of the free enterprise system. Here, students in this specialization prepare themselves for careers with advertising agencies, company advertising departments, retail advertising, promotion, and the media.

The advertising curriculum is accredited by A.C.E.J.

First Year		Second Year	
Journalism 1	2	Journalism 18	3
Journalism 10	3	Journalism 113	3
English 1	3	English elective	3
English 2	3	Core A elective	3
Science	8	Economics/Social Science	6
Humanities	6	History	6
Political Science	3	Science	6
Core A elective	3	Political Science	3
Physical Education	2		

Third Year		Fourth Year	
Journalism 114	2	Journalism 139	2
Journalism 115	2	Journalism 299	3
Journalism electives°	5-6	Journalism electives°	5-6
Minor Field	6	Minor Field	6
Electives	13	Electives	13-15
English elective	3		

°Advertising majors select two speciality areas:

(Journ. 286, 251)	(Journ. 120, 131)	(Journ. 189, 286)	(Journ. 188, 228)
(Journ. 203, 204)	(Journ. 110, 210)	(Journ. 111, 112)	

BROADCAST JOURNALISM

This curriculum is designed to provide the student an opportunity to learn the theory and application of the art and science of news and public affairs reporting via the electronic media—radio, television, and cable.

Supported by a broad liberal arts background, the curriculum features an effective preparation in the philosophy, concepts, and skills of informational programming in professional broadcasting. Such preparation provides the student with an appreciation of radio, television, cable, and motion pictures as communicative and journalistic arts. Additionally, it challenges the student's ability to evaluate and criticize broadcast media capabilities and limitations, functions, performance, responsibilities, and influence in society.

Professional staff members of WVU's Office of Radio, Television, and Motion Pictures hold joint appointments and teach broadcast journalism courses. This office operates the University-owned educational television station, WWVU-TV.

Students seeking a career in the news and information area in broadcasting should pursue this curriculum. A double minor is required. One of these minors must be speech communication; political science is recommended for the second.

First Year		Second Year	
Journalism 1	2	Journalism 18	3
Journalism 80	3	Journalism elective	3
English 1	3	English electives	6
English 2	3	History	6
Physical Education	2	Political Science	3
Science	8	Science/Mathematics	6
Humanities	6	Core A elective	3
Political Science	3	Speech Com. elective	3
Speech Com. 11 and 14	3		

Third Year		Fourth Year	
Journalism 182	3	Journalism electives	6-7
Journalism 183	3	Journalism 284	3
Journalism 189	3	Journalism 299	3
Speech Com. electives	6	Electives	18
Economics/Social Science	6		
Political Science electives	6		
Electives	3		

Approved journalism electives: Journ. 19, 111, 113, 120, 128, 227, 228, 286, 289.

PUBLIC RELATIONS

A relatively new profession within the sphere of communications, public relations offers practitioners challenging opportunities to explain organizations—industrial, educational, military, charitable—to their publics. The profession has had its major advance since World War II, and today more than 100,000 persons are practicing in the field. WVU graduates are finding ready acceptance of their services.

Public relations offers rewarding careers to both men and women. Several fields—transportation, entertainment, convention arrangements, and company newspapers—seem to prefer the feminine touch. Husband and wife PR teams are not uncommon, so the woman who wishes to follow a dual career—homemaker and part-time or full-time professional work—finds public relations a flexible activity to fit her uncertain schedule.

The PR curriculum is organized to provide the student a comprehensive familiarity with all aspects of communications—written, spoken, and image. The student learns to gather, interpret, and present information in the varied media of communications—newspapers, radio, TV, and specialized forms (brochures, reports, slides, speeches, etc.). He learns principles of advertising, photography, typography and layout, PR programming, and organizational and management functions.

A public relations major is encouraged to select a minor that will provide him with a deeper understanding of personal and interpersonal relationships, e.g., political science, psychology, sociology, or one that will enhance his projected area of practice, e.g., business and economics, education, science.

First Year		Second Year	
Journalism 1	2	Journalism 18	3
Journalism 10	3	Economics/Social Sciences	6
English 1	3	English	6
English 2	3	History	6
Physical Education	2	Minor subject	3
Humanities	6	Science/Mathematics	6
Science	8	Core A elective	3
Core A elective	3		
Political Science	3		

Third Year		Fourth Year	
Journalism 111	3	Journalism 112	2
Journalism 113	3	Journalism 221	3
Journalism electives	2-3	Journalism 299	3
Political Science	3	Journalism electives	5-6
Speech Com. 11 and 12, 13 or 14	3	Minor subject	6
Minor subject	6	Electives	12-14
Electives	13		

Approved journalism electives: Journ. 80, 110, 118, 120, 130, 131, 141, 182, 183, 189, 203, 210, 220, 227.

JOURNALISM EDUCATION

The School of Journalism has been working for a number of years with journalism teachers and administrators in West Virginia schools to improve journalism instruction and school publications. An even greater effort has been mounted over the past decade by way of regional high school workshops, summer workshops for students and teachers on the University campus, and individual consultation with schools by members of the School of Journalism faculty.

One of the outgrowths of this cooperative effort has been a new certification program in journalism. There were quasi-official certification programs until 1966, but since that time it has been possible for a person to be certified to teach journalism. The student who finishes the curriculum outlined here and receives the degree of Bachelor of Science in Journalism will qualify for a first-class professional certificate in West Virginia with teaching fields in Journalism and English (or other fields of student's choice), Grades 7-12.

While English is selected as the second field by most journalism majors, one may name social studies, speech communication, art, or another field. However, one must also add 9 hours of English and Speech Communication from the General Studies section of the certification program.

First Year		Second Year	
Journalism 1	2	Journalism 18	3
Journalism 10, 41, 113	3	Journalism 19	3
English 1	3	Mathematics 21**	2
English 2	3	Mathematics 22	2
Science	8	Health Education 102	2
Art 30	3	Social Science 1***	3
Music 30	3	Social Science 2	3
History 1	3	English 21 (121)*	3
History 2	3	English 22 (122)*	3
Physical Education	2	English 24*	3
		English 25*	3
		Curric. & Instrn. 7	1

Third Year		Fourth Year	
Journalism 125	2	Journalism 120	3
Journalism electives	7-8	Journalism 227	3
Educ. Psych. 105	3	Journalism 299	3
Educ. Psych. 106	3	Curric. & Instrn. 104	4
Curric. & Instrn. 280	3	Curric. & Instrn. 188	6
English 111	3	Curric. & Instrn. 287	2
English 150	3	Journalism electives	5-8
English 131, 220, 235, 266, 286	3	English 132, 163, 164, 263, 264, 265, 267, 284, 365	3
English 161, 162, 255, 256, 261, 262	3	English 125, 234, 236, 337 or Humanities 141, 142	3
Speech Com. 11, 14 or Drama 50	3		

Approved journalism electives: Journ. 110, 111, 113, 118, 141, 220, 228, 230.

*These English requirements are different if a student chooses a second teaching field other than English.

**Mathematics 15 (4 hr.) may be substituted for Mathematics 21 and 22.

***Economics 51 (3 hr.), Political Science 2 (3 hr.), and Sociology 1 (3 hr.) may be substituted for Social Science 1 and 2.

If a student elects journalism as a second field, he must take Journalism 1, 18, 19, 120, 125, and 227 for a total of 16 hours plus 5 hours of journalism electives.

A student must attain an overall grade-point average of 2.25 before he is admitted to student teaching, and his grade-point average must be at least 2.0 in any field he chooses for certification. Furthermore, the student must not plan to enroll for any courses outside of the teaching block in the semester during which he plans to do student teaching; he may have to teach in a community away from Morgantown.

COURSES OF INSTRUCTION

Journ.

1. **Introduction to Mass Communications.** I, II. 2 hr. Recommended for all University students. Role of the mass communicator in developing the political, social, and economic fabrics of a democratic society. Organization and function of newspapers, magazines, broadcast stations, and other principal media of mass communications, including the role of advertising.

10. **Visual Communication.** I, II. 3 hr. Introduction to graphic arts as a communication medium. The course is divided between discussion of photography and typography with emphasis on basic techniques and aesthetics.

18. **News Writing.** I, II, S. 3 hr. Essentials of fact-gathering; writing news and features; attention also is given to the ethics and responsibilities of news reporting. Typing ability required. Separate lab sections offered for journalism majors and non-majors. Also, an honors section (AA) and lab (BB) are available to students with previous newswriting experience. Two lec. and a 2-hr. lab-demonstration period.

19. **Copy Editing and Make-Up.** I, II, S. 3 hr. PR: Journ. 18. A combination lecture-lab once a week for four hours plus lab experience at a local newspaper. Study of copy editing, headline writing, the handling of wire copy, and newspaper make-up.

41. **Journalism Problems.** I, II, S. 1-3 hr. For freshmen and sophomores. Intensive study, independently conducted, of a specialized area or problem in journalism; to be approved by the Dean.

80. **Introduction to Broadcasting.** I, II, S. 3 hr. Open to freshmen and sophomores. Survey of the industry and its role in today's society. Historical development of broadcasting, federal regulation, industry codes, broadcaster responsibilities, job opportunities. Broadcasting research, contemporary problems (including CATV). (Also listed as Speech Com. 80.)

108. **The Community Newspaper.** I. 2 hr. Open to all University students. Fundamental problems and techniques in the operation and management of small community newspapers.

110. **Typography and Printing Processes.** I, II, S. 3 hr. Fundamentals of print production, including design and composition procedures for major printing processes, discussion and application of typographic aesthetics. Students must acquire tools for the course: cost about $5.00. One lec., 2-hr. lab.

111. **Public Relations Principles.** I, II, S. 3 hr. Open to all University students; required in the public relations curriculum. Survey course introduces the student to communication between an organization and its publics. Definition and historical development, opportunities and challenges, techniques and management of public relations are included. Written assignments include typical public relations communications projects—the promotional pamphlet, executive speech, news release, and others.

112. **Industrial and Technical Journalism.** I, II. 2 hr. Study of the relations between industry and its many publics, with emphasis on internal and external company publications as public relations media. Extensive practice in planning and writing materials and in page make-up for industrial publications and trade journals.

113. **Principles of Advertising.** I, II, S. 3 hr. Open to all University students. Survey of the function of advertising in the American economic system for national and retail advertisers. Study of individual advertising and media, copy and layout problems, appeals, research production, schedules, federal and state laws affecting advertising, and ethics. Practical laboratory work in writing and layout of advertising. Two lec. One 2-hr. lab.

114. **Newspaper Advertising and Selling.** I, II. 2 hr. PR: Journ. 10 and 113, or consent. Planning, preparation of newspaper advertising campaign for a daily newspaper, including supplementary assignments in radio copy, direct mail, outdoor advertising, and sales promotion. Two hr. lecture.

115. **Advertising Copy and Layout.** II. 2 hr. PR: Journ. 10, 113, and 114, or consent. Copy platforms, print production and layout, mechanical specifications. Special assignments in direct mail and media research. Two hr. lecture.

118. **Reporting.** I, II, S. 3 hr. PR: A grade of C or higher in Journ. 18. An advanced course emphasizing development of a student's ability to cover and write news stories. Students have the opportunity to write features, breaking news, interpretive reports, personality profiles, and investigative stories. As part of this experience, students are expected to get their stories printed in the student newspaper, local downtown papers, or other media outlets.

120. **Introduction to Photography.** I, II, S. 3 hr. Basic techniques of film developing and printing. Each student is required to purchase his own film, enlarging paper, and to have a camera. Cameras may be rented from the WVU Book Store for $35.00 per semester; film and enlarging paper cost approximately $25.00 per semester.

125. **High School Journalism.** II, S. 2 hr. Only for B.S.J.E. candidates and students seeking Language Arts certification. Survey of scholastic publications and techniques; suggested methods of instruction.

128. **Reporting of Public Affairs.** II. 3 hr. PR: Journ. 18 or consent. Reporting of local, state, and federal government activities and other public affairs. Includes visits to public agencies and training in spot news and depth reporting in public affairs.

130. **Advanced Photography.** I. 3 hr. PR: Journ. 120 or equiv., or consent. Advanced and wide-ranging course designed to equip students to serve all

communication media (including magazines, newspapers, television) or photographic galleries. A high level of competence is assumed at the outset. Emphasis on individual approaches to photography, creativity, and high quality craftmanship. Course requirements include a portfolio (general or around a specific theme) and an essay on the work of a recognized (contemporary or historical) photographer. Students must provide their own photographic equipment, film, paper, and be prepared to pay $5.00-$10.00 for chemicals.

131. **Advertising Photography.** II. 3 hr. PR: Journ. 120 or consent and Journ. 113. Fundamentals of studio and outdoor photography layout and design.

139. **Seminar in Advertising Management Problems.** I, II. 2 hr. PR: Senior standing and major or minor in advertising. Current trends in advertising, merchandising, and distribution problems. Students develop individual projects in some phase of advertising or management.

141. **Advanced Journalism Problems.** I, II, S. 1-6 hr. For juniors and seniors. Intensive, independent study; to be approved by the Dean.

182. **Broadcast Journalism I.** I, II. 3 hr. PR: Journ. 18 or consent. Lecture-laboratory course oriented to radio news. Gathering, writing, editing, and presenting news for radio. Outside taping and studio taping, broadcasts; monitoring of local and network newscasts. Special emphasis on writing news scripts. Continuing emphasis on reportage, news ethics, and current events.

183. **Broadcast Journalism II.** I, II. 3 hr. PR: Journ. 182 or consent. Continuation of Journ. 182, with course content oriented to television news.

187. **Appreciation of the Motion Picture.** I, II. 3 hr. Viewing lab. An introduction to the appreciation of the motion picture and the television film as art forms. Principles of aesthetics involved in evaluating films. Attention given to the various types of films: art film, documentary, entertainment, experimental, instructional, etc. Weekly viewing and evaluation sessions. (Also listed as Speech Com. 187).

189. **Newsfilm in Television.** I, II. 3 hr. Fundamentals of planning, shooting, editing, and scripting of newsfilm for television newscasts.

203. **Media Management and Promotion.** I, II. 3 hr. PR: Journ. 113 and 115. Problems, functions, and responsibilities in communications media organization, operation, management, and promotion. Special emphasis on case study of media management and promotion in the Appalachian area.

204. **Advertising Markets and Media.** I, II, S. 3 hr. PR: Journ. 113. Study of advertising planning, buying, and scheduling by advertisers, media, and advertising agencies on national and local levels. Seminar discussions and assignments with special emphasis on problems related to Appalachian markets and media.

210. **Advertising Production.** II. 3 hr. PR: Journ. 110. Techniques and mechanics of producing print advertising. Study includes art, typography, printing processes, layout, make-up, and scheduling. Student must acquire tools and supplies for lab work; cost: about $10.00.

220. **Feature Writing and Marketing.** I, II. 3 hr. PR: Competence in English fundamentals: grammar, punctuation, syntax, spelling. For juniors, seniors, and graduate students. All work must be typed. Advanced seminar in writing and publishing magazine articles and in-depth newspaper articles. The student proposes worthwhile topics for specified publications, intensely researches the subjects, submits query letters, writes and rewrites the articles in interesting, professional style, submits articles for publication. Emphasis on collecting information, high quality writing—with stress on fundamentals—and professional preparation of manuscript. Journalism majors must have completed Journ. 18. Other journalism writing courses and creative writing courses would be good preparation.

221. **Public Relations Interning.** I, II. 3 hr. Open only to junior, senior, and graduate public relations majors. Here the student learns through on-the-job training and from reports of those who have on-the-job experience. Course is structured along a public relations agency organization and operations.

227. **History of Journalism.** I, II, S. 3 hr. PR: Hist. 52 and 53 or consent. Open to all University students. A study of the impact of the American press on the nation; the development of today's communications media from the beginnings in seventeenth century England and in the American colonies; an examination of the great names in journalism from the standpoint of their contributions to today's journalism; freedom of the press and its current implications.

228. **Law of the News Media.** II. 3 hr. For seniors and graduate students. A study of the law as it affects the mass media. Considered are such areas as libel, public records, criminal pre-trial publicity, freedom of information, obscenity.

230. **Editorial and Interpretive Writing.** I. 3 hr. Open to all University students. The student will analyze and write editorials and commentaries. He will study typical editorial pages and the ethics governing editorial page content. He will also become familiar with libel, privacy, contempt, and other problems—operating and political—as they arise.

251. **Direct Mail Advertising.** I. 3 hr. PR: Journ. 113 and 114 or consent. Study of mailing, marketing, and creation of direct mail letters, brochures, involvement pieces, and reply cards. Also a study of postal regulations, direct mail law, and printing procedures. Two lec., one lab.

284. **Public Affairs Programming.** I, II. 3 hr. PR: Journ. 183. Preparation and presentation of public issues via television. Includes methods of topic selection, research, organization of ideas and script development, alternate formats, ethical and legal constraints. Students prepare materials for possible publication by broadcasting.

285. **Special Topics in Broadcast Journalism.** I, II. 1-6 hr. PR: Journ. 284. Directed independent investigation of selected topics in broadcast journalism. Repeatable up to 6 hr.

286. **Radio and Television Advertising.** I. 3 hr. PR: Journ. 113 and consent. Development of radio and television writing techniques. Media planning, buying; market analysis. Federal regulations affecting advertising in broadcast media.

289. **Documentary Motion Picture Production.** II. 3 hr. PR: Journ 189 and 281 or Speech Com. 184 or 280. In-depth development of the techniques and resources utilized in the production of a complete documentary motion picture. Areas of study include films, processing, cinematography, editing, research, writing, music, narration. Lab oriented. It may be necessary for students to pay for camera rental and for their own film stock and film processing.

299. **Contemporary Media Issues and Ethics.** I, II. 3 hr. Required of all senior journalism majors. An in-depth study of contemporary media issues such as right of access to media, morality in news and advertising, new FTC and FCC regulations, media responsibility to society, social responsibility of media professionals. Individual research papers on issues with ethical considerations.

302. **Seminar in Communications Theory.** I. 3 hr. PR: Social psychology or philosophy of science. For graduate students. Communications theory drawing heavily on social psychology and other behavioral theory. Philosophy of science. Theory as knowledge. Familiarization with communications theories. How to draw on published research findings and theory for understanding society. Student begins to learn how to apply theory to problems in the student's area of communications interest. Beginning of thesis development.

312. **Seminar in Institutional Relations.** II. 3 hr. Study of the problems of public information officers in educational institutions of higher learning and public service organizations; thorough study of the publics which these officers attempt to reach.

315. **Seminar in Journalism Education.** I, S. 1-3 hr. Discussion of journalism education problems. Each student will do an individual research project planned to provide for his professional development as a teacher of journalism. Emphasis on secondary school problems.

339. **Seminar in Advanced Advertising Management Problems.** II. 3 hr. Recently developed ideas and techniques in advertising, advertising research, and media management.

341. **Special Topics.** I, II, S. 1-6 hr.

343. **International Communications.** I. 3 hr. International news gathering and dissemination—including wire services, broadcast satellites, and political barriers—will be examined, particularly as these factors affect a free exchange of information within the world community. Efforts by the United Nations to encourage news exchange and to lower news barriers will be a major case examination.

344. **Seminar in the Foreign Press.** II. 3 hr. Studies in legal and communications problems of the international flow of news and opinion; international press codes; communications media of major countries.

Division of Military Science and Air Force Aerospace Studies

West Virginia University, a beneficiary of the Act of Congress of 1862, offers qualified applicants two- and four-year courses of instruction in military Science (ROTC) and Air Force Aerospace Studies (ROTC). Normally, successful completion of one of these courses and degree requirements leads to a commission as Second Lieutenant in the United States Army Reserve or the United States Air Force Reserve.

Equivalent credit for part or all of the four basic semesters of ROTC may be granted in accordance with existing service regulations. This credit may also apply for: prior active military service, high school ROTC, military school (Army ROTC at high school level), attendance at service academies, junior college senior division Army ROTC, or Civil Air Patrol training.

Under provisions of the Military Selective Service Act of 1967, as amended by the 92nd Congress, all cadets enrolled in ROTC programs may be deferred, by the Professor of Military Science or the Professor of Aerospace Studies, from military service until completion of their military courses and receipt of the baccalaureate degree and commission. Such deferment is subject to cancellation should the student not be selected for retention in ROTC, fail to remain in good standing, or fail to develop the qualities required of an officer. Also, induction orders for designated applicants for the two-year ROTC program may be postponed, effective the beginning of the Second Semester preceding the student's enrollment in advanced ROTC. After acceptance and enrollment in advanced ROTC, designated applicants receive deferments as stipulated for cadets in the four-year program.

Deposit

Each ROTC student is required to pay a yearly nominal deposit of $20.00 to cover any loss or damage to issued property in his possession. The deposit is paid to the University Comptroller at the time of registration and is refunded, less a yearly nominal administrative and service charge, upon return of the undamaged property. Cadets in both ROTC programs are permitted to keep their uniforms upon successful completion of the program.

MILITARY SCIENCE (U. S. Army)

Faculty and Staff

Duquesne A. Wolf, COL, M.S., *Professor.*
McPherson G. Elliott, III, MAJ, B.A., *Assistant Professor.*
Bobby J. Getz, MAJ, B.S., *Assistant Professor.*
Carl W. Albright, CPT, B.A., *Assistant Professor.*
James N. Hawthorne, Jr., CPT, M.S., *Assistant Professor.*
Lynn W. Kling, CPT, M.Ed., *Assistant Professor.*
Lawrence A. Ditton, SGM, *Sergeant Major.*
Bobby Timms, MSG, *Instructor.*
Forest F. Facemire, SFC, *Supply NCO.*
Orvis W. Bittinger, SFC, *Administrative Specialist.*

Mission

The Military Science curriculum is designed to qualify selected male college students for commissioning as officers in the United States Army Reserve. Students who have demonstrated academic and military excellence will be given the opportunity to apply for a commission in the Regular Army. Students who meet the criteria for a Regular Army commission will be designated Distinguished Military Students.

Scholarship Program

Scholarships are available for one, two, three, and four years. Students awarded scholarships will receive a subsistence allowance of $100 per month during the academic year. The government will pay for the cost of tuition, fees, and textbooks. One, two, and three year scholarships can be applied for through the office of the Professor of Military Science.

Allowances

Students enrolled in advanced ROTC and all scholarship students receive an allowance of $100 per month during the academic year.

Flight Instruction Program

Students who apply and who meet the physical and mental requirements will be enrolled in the Flight Instruction Program at no cost to themselves. During the senior year such students will attend ground school and flight training at the Morgantown Municipal Airport. Successful completion of the program will qualify the student as a private pilot. The student, upon commissioning, may be considered for Army aviation training.

Summer Camp

Before a student can be commissioned, he must attend a 6-week Summer Camp usually between the junior and senior year. While there, cadets will receive travel allowances, and one-half the pay of a second lieutenant. Selected cadets may, on a voluntary basis, attend airborne school at their own expenses, or ranger school in lieu of summer camp.

Two-Year Program

Selected students who apply will be enrolled in a two-year program that leads to an Army commission. The student will attend one 6-week camp prior to beginning the advanced course, in addition to completing the requirements of the advanced course.

Courses of Instruction

Basic Course—First Year (Army)

Military Science 1. 2 hr. The United States defense establishment. Organization of the Army and ROTC. Historical growth and development of the U. S. Army. Significance of military discipline; courtesies, customs, and traditions of the service. Leadership development through practical exercises. An introduction to service weapons and firing of the caliber .22 rifle. Two class hours, one lab hour (averaged) per week.

Military Science 2. 2 hr. The United States defense establishment (continued). Structure of the Department of Defense and its relationship to other elements of the U. S. Government. Structures, roles, and interrelationships of the armed services with emphasis on the U. S. Army. Basic map reading course. Two class hours, one lab hour (averaged) per week.

Basic Course—Second Year (Army)

Military Science 3. 3 hr. Operations of the basic military team to include a review of the use of maps and military geography. Continuing development of leadership through practical exercises in the functions, duties, and responsibilities of junior leaders. Two class hours, one lab hour (averaged) per week.

Military Science 4. 3 hr. A study of the development of American military institutions, policies, experience, and traditions in peace and war from colonial times to the present. Two class hours, one lab hour (averaged) per week.

Advanced Course—Third Year (Army)

Military Science 105. 4 hr. PR: Basic course or equiv.* The fundamentals of leadership and the exercise of command; the preparation, presentation, and evaluation of instruction; review of the American role in world affairs. Three class hours, one lab hour (averaged) per week.

Military Science 106. 4 hr. PR: Mil. Sci. 105 or consent. The roles of the various branches of the Army; fundamentals of small-unit tactics; practical training in preparation for Summer Camp. Three class hours, one lab hour (averaged) per week.

Advanced Course—Fourth Year (Army)

Military Science 107. 4 hr. PR: Mil. Sci. 105 and 106 or consent. Stresses responsibilities in leadership and affords experience through performance as cadet leaders. Study of personnel management, logistical operations, military justice, military intelligence, and operational duties. Three class hours, one lab hour (averaged) per week.

Military Science 108. 4 hr. PR: Mil. Sci. 105, 106, and 107 or consent. Leadership experience through performance in drill and selected tactical classes. Fundamentals and dynamics of the military team and a continued review of the American role in world affairs. Three class hours, one lab hour (averaged) per week.

AEROSPACE STUDIES (U. S. Air Force)

Faculty and Staff

Howard A. Thornhill, COL, M.A., *Professor.*
Glenn L. McNutt, MAJ, M.S., *Assistant Professor.*
L. Kent McBee, CAPT, M.A., *Assistant Professor.*
David D. Calvert, CAPT, M.S.I.E., *Assistant Professor.*
Gerald F. Gude, CAPT, M.S.B.A., *Assistant Professor.*

*Equivalent credit may be granted by the WVU Dean of Admissions and Records and either the Professor of Military Science or the Professor of Aerospace Studies on the basis of prior military service or ROTC training other than courses in Military Science or Aerospace Studies taken at WVU.

Gene A. Burgess, TSG, *Sergeant Major.*
Harold R. Easterling, TSG, *Personnel Specialist.*
Woodrow W. Hileman, Jr., SSG, *Administrative Specialist.*
James R. Hutchison, SSG, *Administrative Specialist.*

Mission

Air Force ROTC was established at WVU in the fall of 1946, as the School of Air Science and Tactics. As a result of the ROTC Vitalization Act of 1964, the curriculum was revised and the departmental title changed to the School of Air Force Aerospace Studies. During the fall, 1967, the title was redesignated as the Division of Air Force Aerospace Studies.

The officer education program under the new legislation is designed to provide training that will develop skills and attitudes vital to the professional Air Force officer. It is designed to qualify those college men and women for commissioning who desire to serve in the United States Air Force.

College Scholarship Program

Certain outstanding students may be selected by the Professor of Aerospace Studies to compete for scholarships under this program.

For students awarded scholarships the government will pay for the cost of tuition, fees, and textbooks.

Scholarships of this nature are available for two, three, or four years.

Allowances

Students enrolled in the Professional Officer Course and all scholarship students receive an allowance of $100 per month during the academic year.

Flight Instruction Program

Students qualified and selected for the pilot category (IP) will be given 15 hours of ground instruction and 36½ hours of flight training at no cost, which may qualify them for a private pilot license. The ground instruction phase of the training normally is taken by students during the First Semester of the senior year. Flight training, conducted at Morgantown Municipal Airport, normally is taken by students during the Second Semester of their senior year. No effective academic credit is given for this instruction.

Distinguished AFROTC Graduate

The Professor of Aerospace Studies may designate as a Distinguished AFROTC Graduate a Professional Officer's Course member who:

1. Has a superior academic record and high AFOQT score.
2. Possesses outstanding qualities of leadership and high moral character.
3. Demonstrates leadership ability through achievement in recognized campus activities, both curricular and non-curricular, which, in conjunction with 1 and 2 above, warrants designation as *"Distinguished."*

Curriculum

The curriculum in Air Force Aerospace Studies is divided into three areas: the General Military Course, Field Training, and the Professional Officer Course.

General Military Course

The Air Force course of study offered during the freshman and sophomore years is the General Military Course (GMC). This is composed of one class hour and one corps training hour per week. The corps training extends beyond drill and ceremonies to include briefings by various Air Force commands and agencies. Students enrolled in the GMC are provided opportunity to visit various air bases to acquaint them more fully with operational Air Force units. Two credit hours are allowed for each semester course successfully completed. Four semesters of the GMC is one means for admission to the Professional Officer Course. However, a two-year Professional Officer Course option is available for those students who do not complete the GMC. This method requires a 6-week rather than 4-week field training in the summer prior to the junior year.

GMC—First year

Air Force Aerospace Studies 1. 2 hr. Study of the doctrine, mission, and organization of the United States Air Force; U. S. strategic offensive and defensive forces: their mission and function; employment of nuclear weapons.

Air Force Aerospace Studies 2. 2 hr. Aerospace defense; missile defense; U. S. general purpose and aerospace support forces; the mission, resources, and operation of tactical air forces, with special attention to limited war; review of Army, Navy, and Marine general purpose forces.

GMC—Second Year

Air Force Aerospace Studies 3. 2 hr. Critical analysis of the development of air power including doctrine, technology, organization and utilization; leadership and managerial communication skills are stressed by having students prepare both written and oral presentations.

Air Force Aerospace Studies 4. 2 hr. An extension of the previous course in which the development of airpower, doctrine, technology, organization, and utilization is analyzed with emphasis upon today.

Field Training

Applicants for the Professional Officer Course must attend a summer Field Training Course before entering their junior year. Students who have completed the GMC are assigned to a 4-week training unit; however, students who did not complete the GMC must attend a more intensive 6-week course. The Air Force will furnish uniforms, housing, medical care, and rations in addition to giving students round-trip travel allowance and military pay. Students who successfully complete Field Training then become eligible for the Professional Officer Course.

Professional Officer Course

The Professional Officer Course (POC) corresponds to the junior and senior years of a student's academic course. Enrollment in the advanced course is also open to graduate students if they have four semesters of school remaining.

The Professional Officer Course is designed to provide highly qualified junior officers for the United States Air Force. Enrollment in the program is based upon

such factors as scholarship, physical qualifications, leadership, desire for flying training, and academic major. Successful completion of the advanced course qualifies the student for appointment as a second lieutenant in the United States Air Force Reserve.

Instruction averages three hours per week throughout the four semesters in addition to the Corps Training hours required. Three hours of credit are allowed for each of the four semesters work in the advanced program subsequent to acceptance by each school or college in the University.

To be eligible for enrollment into the POC, students must meet the following requirements:

1. Make application for the POC at the beginning of the Second Semester of the sophomore year.
2. Be physically qualified in accordance with Department of Air Force standards.
3. Be under 30 years of age at the time of commissioning, except that pilot and navigator applicants must not be older than 26½ years when commissioned.
4. Complete the GMC and field training courses or have equivalent credit in lieu thereof.
5. Pass the Air Force Officer Qualifying Test (AFOQT).
6. Have a minimum cumulative grade-point average of 2.0.
7. Have four semesters of undergraduate or graduate school remaining.
8. Enlist in the Air Force Reserve for a period of six years—eight years for those in the college scholarship program.
9. Execute a written agreement to complete the advanced course and attend a summer field training course.
10. Agree to accept a commission as a second lieutenant in the USAF Reserve and serve at least four years if not on flying status, or six years if pilot or navigator qualified.
11. Be accepted by the Professor of Air Force Aerospace Studies.

POC—Third Year

Air Force Aerospace Studies 105. 3 hr. PR: GMC or equiv. The military in American society. An in-depth look into the context of American defense policy; strategy and the use of force; bureaucracy and technology; and military sociology. Leadership and managerial skills are stressed through both written and oral class presentations.

Air Force Aerospace Studies 106. 3 hr. PR: AFAS 105 or consent. Analysis of the current national security strategy of realistic deterrence and the management of defense resources; evaluation of modern aerospace weapons systems, space operations, and future roles and missions for the U. S. Air Force.

POC—Fourth Year

Air Force Aerospace Studies 107. 3 hr. PR: AFAS 105, 106 or consent. Intensive study of military law, management, command and staff policies, and seminar of leadership theory and career opportunities within the Air Force.

Air Force Aerospace Studies 108. 3 hr. PR: AFAS 105, 106, 107 or consent. Study of human relationships, problem-solving techniques, management and leadership case studies; seminar on the junior officer in the Air Force.

School of Mines

Today's opportunities in the mineral and petroleum industry have never been greater. Energy is the watchword. Mining and petroleum engineers move into top management positions fast—general managers, chief engineers, vice-presidents, and presidents.

The student need only look at the 500 WVU mining and petroleum engineering graduates for proof. They have quickly achieved positions of prominence in the mineral extractive industry. With this country daily placing more and more importance on energy, this is the student's opportunity to become part of one of our nation's most vital and important industries.

Fossil fuel engineering is a profession which brings into play a broad range of skills and activities—planning, supervising, and operating all types of mineral extractions, both above and below ground.

Mining engineering is the science of producing solid fuels and metals—coal, lignite, oil shale, iron, copper, gold, aluminum, uranium—to mention just a few. And how about the non-metallic minerals? Limestone, diamonds and others.

If the student's forte is petroleum or natural gas, engineering courses at the WVU School of Mines cover the exploration, drilling, production, and evaluation of oil and natural gas reservoirs.

The student may also be interested in courses in mineral processing and mineral resource and energy economics. National and regional problems associated with growing energy demands in the midst of environmental controls make it important for engineers of the future to include economics and process engineering in their study programs.

Today, the demand for mineral engineers is worldwide—oil from the Middle East or from the North Slope of Alaska; coal from the heartland of the United States and copper from South America. And there are even bigger things ahead—like natural gas and gasoline from coal. Liquefaction and gasification are part of the future of the graduate of the School of Mines.

Located in the center of one of the greatest mineral producing areas of the country, the School of Mines is handy to industrial, mining, petroleum, and natural gas-producing areas. It provides faculty and students alike with first-hand observation of mineral production. It allows students and their professors to participate in research, industrial consultation, and membership in professional mineral engineering societies and activities. No wonder the School of Mines provides unequalled expertise in the mineral industry.

Specialization is the password at the School of Mines. Examination or a transcript from an accredited high school is the first step for admission.

Here are the requirements:

1. Four units of English.
2. Two units of algebra.
3. One unit of geometry.
4. One-half unit of trigonometry.

If the student can't meet these requirements in mathematics, he can apply for admission to the pre-mining curriculum.

One other thing. All students entering as first-semester freshmen must take the American College Testing Program tests (ACT) and have the scores forwarded to WVU. This is used for placement purposes and no other test may be substituted for it.

There's probably no other area of study in WVU that has so many scholarships, awards, prizes, and loan funds available to it for qualified students. And if that's not enough, the School of Mines has a cooperative plan with participating companies. The student attends WVU half a year and works for the participating company the other half. And the money you earn, in most cases, takes care of all your educational expenses. Summer employment is also available. As a matter of fact, one of the world's largest coal producers has a policy of hiring any WVU mining student for summer employment if he or she so wishes.

In addition, a number of the largest oil and gas companies with facilities in West Virginia also provide summer employment for students enrolled in the petroleum engineering department of the School of Mines.

FACULTY

Jay Hilary Kelley, Ph.D. (Penn. St. U.), *Dean.*

Mining Engineering

Arthur Lee Barrett, B.S.E.M. (U. Ill.), *Visiting Professor.*
Charles T. Holland, P.E., M.S.E.M. (WVU), *Professor Emeritus.*
Jay Hilary Kelley, Ph.D. (Penn. St. U.), *Professor.*
Calvin Konya, Ph.D. (U. Mo.—Rolla), *Assistant Professor.*
Joseph W. Leonard, M.S. (Penn. St. U.), *Associate Professor.*
Duane Letcher, M.S. (U. So. Dak.), *Instructor.*
Joseph D. McClung, P.E., M.S.E.M. (U. Pitt.), *Associate Professor.*
John Manton, M.S. (U. Pitt.), *Instructor.*
Ernest J. Sandy, P.E., M.S.E.M. (U. Pitt.), *Associate Professor.*
Thomas L. Savage, B.S. (Cornell U.), *Instructor.*
Earle P. Shoub, B.S. (Brooklyn Tech), *Adjunct Professor.*

Petroleum Engineering

Abdel K. Kotb, P.E., Ph.D. (U. Okla.), *Associate Professor.*
Richard W. Laird, P.E., M.S.E.M. (WVU), *Professor.*
Herman H. Rieke, Ph.D. (U. So. Calif.), *Assistant Professor and Research Engineer.*
James A. Wasson, P.E., M.S.P.E. (Penn. St. U.), *Associate Professor.*

Mineral Economics

Richard T. Newcomb, Ph.D. (U. Minn.), *Professor.*

Mineral Processing Engineering

Duane R. Skidmore, Ph.D. (Fordham U.), *Professor.*
Leonard M. Bianchi, M.S. (Rensselaer Polytechnic Inst.), *Associate Professor.*
Suresh P. Babu, Ph.D. (Ill. Inst. Tech), *Assistant Professor.*
Richard B. Muter, M.S. (WVU), *Instructor.*

Coal Research Bureau

Joseph W. Leonard, M.S. (Penn. St. U.), *Director and Associate Professor.*
Kenneth K. Humphreys, P.E., M.S. (WVU), *Assistant Director and Associate Professor.*
David J. Akers, Jr., B.S. (WVU), *Research Technician I.*
Jerry Coalgate, B.S. (Salem C.), *Research Technician I.*
Linda Z. Condry, B.S. (WVU), *Research Technician I.*
Lionel L. Craddock, M.S. (WVU), *Research Assistant III.*
Harold V. Fairbanks, M.S. (Mich. St. U.), *Research Fellow.*
Suresh P. Babu, Ph.D. (Ill. Inst. Tech), *Research Engineer and Assistant Professor.*
William H. Buttermore, B.A. (WVU), *Research Technician I.*
Mary Alice Hannah, B.S. (WVU), *Research Technician I.*
Kathryn Huffman, M.S. (WVU), *Research Chemist II.*
William F. Lawrence, B.S. (Waynesburg C.), *Project Supervisor.*
James D. McClung, B.S. (WVU), *Research Engineer.*
Phil O. McClung, B.A. (WVU), *Research Technician I.*
Charles R. McFadden, B.S. (WVU), *Research Technologist I.*
Richard B. Muter, M.S. (WVU), *Supervising Research Chemist.*
Larry L. Nice, B.S. (WVU), *Research Chemist.*

Mining and Industrial Extension

Thomas L. Savage, B.S. (Cornell U.), *Assistant Director.*
Donald M. Bondurant, P.E., B.S. (Ohio St. U.), *Supervisor, Industrial Extension.*
L. Bennett Ferguson, *Instructor.*
Robert Halstead, B.S. (Morris Harvey C.), *Instructor.*
Harry M. Hoyson, B.S. (U. Pitt.), *Instructor.*
John Manton, M.S. (U. Pitt.), *Instructor.*
Peter P. Mintreas, B.S. (WVU), *Instructor.*
Herman Sparks, M.A. (WVU), *Instructor.*
Lloyd B. Tolbart, B.S. (Concord C.), *Instructor.*
Leland H. Winger, B.S. (WVU), *Instructor.*
Duane A. Letcher, M.S. (So. Dak. St. U.), *Instructor.*

ECPD Accreditation

The Engineer's Council for Professional Development (ECPD), a joint body concerned with the enhancement of the status of the engineer and the engineering profession, has been designated by its constituent bodies (American Society of Civil Engineers, American Institute of Mining, Metallurgical and Petroleum Engineers, American Society of Mechanical Engineers, Institute of Electrical and Electronics Engineers, American Society for Engineering Education, American Institute of Chemical Engineers, American Institute of Aeronautics and Astronautics, National Council of State Boards of Engineering Examiners, American Institute of Industrial Engineering and Engineering Institute of Canada) as the coordinating agency for the accrediting of undergraduate engineering curricula in the United States.

The mining and petroleum engineering curricula are fully accredited by the ECPD.

AIME Chapter

The School of Mines has a very active student chapter of AIME (American Institute of Mining, Metallurgical, and Petroleum Engineers). It is a composite chapter composed of mining and petroleum engineering students.

They have regular monthly meetings and the programs include speakers from the mining and petroleum industries. Several industrial inspection tours are arranged each semester to mining and petroleum production operations. Students, along with the faculty, attend several national and local technical meetings of the AIME each year.

Requirements for Degrees

Any student in order to be eligible for a bachelor's degree in any branch of engineering for which degrees are offered, in addition to satisfying all entrance requirements, shall be required to complete satisfactorily the number of semester hours of work as specified in the curriculum of the department leading to the degree for which the student is a candidate, plus the general requirements of physical education and English proficiency.

A grade of C or better must be attained in each mathematics course before registration in a subsequent mathematics course is allowed.

Professional Degrees

WVU confers the professional degrees of Engineer of Mines (E.M.) and Petroleum Engineer (Pet.E.). The professional degree is conferred upon graduates of the School of Mines on the basis of practical experience and study in absentia, the presentation of a thesis, and oral final examination. To be eligible, a candidate for the professional degree must have been in active practice of his profession for at least five years since receiving his first degree, and must have been in responsible charge of important work for at least two years.

Application for registration as a candidate for a professional degree should be made not later than October 1 in the academic year in which the degree is desired. Detailed regulations and registration blanks may be obtained from the Dean of School of Mines.

CURRICULA

The following engineering curricula are offered in the School of Mines.

1. A four-year curriculum leading to the degree of Bachelor of Science in Engineering of Mines.
2. A four-year curriculum leading to the degree of Bachelor of Science in Petroleum Engineering.
3. A combined science and engineering curriculum leading to the degree of Bachelor of Science and Bachelor of Science in Engineering of Mines or Bachelor of Science in Petroleum Engineering.

In the four-year curricula the first two years of instruction are alike. During this period the student is given a thorough grounding in mathematics, physics, chemistry, English composition, and geology, as well as an introduction to history and economics. During the third and fourth years, the student is given instruction in the engineering sciences as well as in the professional subjects pertaining to mining engineering and petroleum and natural gas engineering. Also, studies in the humanities are continued with the student being permitted to elect a reasonable proportion of the subjects to be studied.

Engineering of Mines

Degree: Bachelor of Science in Engineering of Mines

Mining Engineering deals with discovering, extracting, beneficiating, marketing, and utilizing minerals from the earth. The role of the mining engineer is quite diversified and there are opportunities for technical specialization in prospecting, development, production, beneficiating, utilization, and marketing. Therefore, the mining engineer must be well trained in the fields of mining and geology and also in the principles of civil, electrical, and mechanical engineering as applied to the mining industry. With the present trend toward the use of engineers in industrial management and administrative positions, the mining engineer's training must also include economics, business, personnel management, and the various humanities.

In this curriculum professional study includes geology and the engineering principles of blasting, materials handling, transportation, hoisting, water control, surface and underground systems of mining, roof control, ventilation, mineral preparation, and plant design. Special consideration is given to the application of mining machinery with particular attention to power transmission and electric and hydraulic control systems.

Special courses in the design of surface and underground mining installations give the student opportunity to use the engineering principles developed in preceding phases of the course, as well as for specialization. The student receives an introduction to the management and social aspects through courses devoted to economic, social, governmental, labor, financial, and safety problems incidental to the operation of a mining enterprise.

In the fourth year the student may specialize in coal mining, ore mining, or other phases of mining engineering by proper selection of design problems and electives. He will be assigned an adviser who will assist him in this phase of the program.

Local coal fields, mines, and preparation plants are used extensively for experimental, instructional, and field work.

Mining Engineering

First Year				Second Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4	Chem. 141	4	Elective (Core A)	3
Math. 15	4	Math. 16	4	Math. 17	4	Math. 18	4
English 1	3	English 2	3	Physics 11	4	Physics 12	4
Geol. 1	3	E.M. 2	3	T.A.M. 51	4	T.A.M. 52	4
E.M. 1	3	Phys. Ed. 2	1	E.M. 106	2	Geol. 151	3
Phys. Ed. 1	1	Elective (Core A)	3				
	18		18		18		18

E. M. 102 (3 weeks Summer) 3

Third Year				Fourth Year			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
E.E. 105	4	E.E. 106	4	M.E. 101	3	E.M. 220	2
C.E. 115	3	I.E. 213	3	E.M. 213	3	E.M. 222	3
E.M. 108	4	E.M. 209	3	E.M. 241	3	E.M. 223	3
Elective (Core A)	3	E.M. 212	3	Elective (Core B)	3	Elective (Core B)	3
Elective (Core B)	3	Elective (Core A)	3	Prof. Elective	3	Prof. Elective	3
		Elective (Core B)	3				
	17		19		15		15

Recommended Professional Electives: E.M. 112, 200, 215, 217, 224, 247, 249, 290.

Petroleum Engineering

Degree: Bachelor of Science in Petroleum Engineering

Petroleum engineering deals with the discovery, production, and transportation of oil and natural gas. Consequently, the petroleum engineer must be thoroughly familiar with the principles of geology as related to the occurrence, discovery, and production of natural gas and petroleum. This training is obtained by the study of geology as well as by the geological principles developed in courses relating to oil field development and production. In addition, the petroleum engineer must be well grounded in the principles of oil and gas production, as well as in the technology of transportation. This training may be obtained in the several courses pertaining to petroleum technology and in natural gas engineering and distribution, as well as the courses given in the engineering and basic sciences and in mathematics. Today, there is a strong trend toward employing petroleum engineers as supervisors, managers, and executives. Education for this type of career is provided by the courses in property evaluation, oil and gas law, as well as in economics and the humanities. In the senior year, electives are provided in which the student may obtain additional training in geology or geophysics, in management, in supervisory skills or in some special phase of petroleum and natural gas technology. Assistance in this phase of the program will be given by an adviser assigned to the student.

The School is particularly fortunate that West Virginia is a petroleum and natural gas producing state, and as a result local production and gas storage fields, secondary recovery projects, compressor stations and refineries provide excellent opportunities for field study of petroleum engineering problems, techniques, and methods. The petroleum laboratories of the School are well equipped for laboratory study of gas measurement apparatus and for core analysis, as well as for the study of drilling muds and for study of and experiments on drilling and pumping machinery.

Petroleum Engineering

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4
Math. 15	4	Math. 16	4
English 1	3	English 2	3
Pet.E. 1	3	Pet.E. 2	3
Geol. 1	3	Elective (Core B)	3
Phys. Ed. 1	1	Phys. Ed. 2	1
	18		18

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Math. 17	4	Math. 18	4
Physics 11	4	Physics 12	4
Chem. 141	4	T.A.M. 52	4
T.A.M. 51	4	I.E. 281	3
	16		15

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Geol. 151	3	Elective (Core A)	3
E.E. 105	4	Pet.E. 211	3
Pet.E. 210	3	Pet.E. 233	3
Pet.E. 212	1	Pet.E. 235	3
Pet.E. 236	3	Geol. 272	3
C.E. 115	3	Elective (Core B)	3
	17		18

Fourth Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Pet.E. 207	4	I.E. 213	3
Pet.E. 234	3	Pet.E. 241	3
Elective (Core A)	3	Pet.E. (Elect.)	3
M.E. 101	3	Electives	
Elect. (Core B)	3	(Core A)	6
		Elective (Core B)	3
	16		18

Recommended Professional Electives: E.M. 207, 230; Pet.E. 216, 224, 240, 242, 243, 244.

Courses of Instruction

General Program

1. **Mineral Engineering Problem Solving.** I. 3 hr. Introduction to problem solving methods in mineral engineering with emphasis on holistic analysis. Specific real problems in the mineral industries will be studied using the various tools such as: information retrieval, literature searching, mineral resource investigations, mineral and energy use and demand patterns, surveying and mensuration techniques; use of mathematical and computer modeling, statistical, and probabilistic methods; computer applications in mineral engineering.

2. **Mineral Engineering Problem Solving.** II. 3 hr.

97. **Man's Energy Needs and Resource Limitations.** 3 hr. Open to any student in the University without pre-requisites. Dilemmas posed for backward and modern societies by rising energy demands amid concerns for the world's environment, given existing resource constraints. Course considers conventional technologies and historical concerns over resource scarcities. Implications for welfare economics are explored. Impact of technological change and both future and exotic energy systems are projected.

98. **National Resource and Energy Policy Problems.** 3 hr. Open to any student in the University without pre-requisites. Survey of resource and energy policy problems as currently formulated and treated on a national level by the Department of the Interior including mineral import quotas, prorationing, federal tax and land law policy, leasing, mineral research and education, health and social concerns. Use of confrontation by citizen action as a catalyst for changing mineral engineering practice is reviewed.

106. **Mineralogy.** I. 2 hr. PR: Chem. 16. Principles of surface and subsurface surveying, celestial observations, and related calculations together with intensive field practice in underground and surface surveying. Lectures and field work arranged.

200. **Elements of Mineral Conservation.** I. 3 hr. Open to any student in the University with junior standing. The economics of conservation for non-renewable resources; traditional and modern views; the new environmentalist concerns. Current and forecast demand and supply conditions for mineral and energy resources including coal, water, oil, gas, ores, and industrial minerals; causes of mineral loss and environmental costs in production and utilization; methods of environmental control and conservation in underground and surface mining.

207. **Introductory Seismology.** I. 1 hr. PR: Physics 11. Earthquakes, their causes and area distribution; theory of elastic waves; principles of seismograph construction, adjustment and operation; interpretation and calculation of seismograms with exercises provided by records of the University seismography station. 1 hr. lecture.

230. **Elements of Geophysical Prospecting.** I. 3 or 4 hr. PR: Geol. 1, Physics 11. Principles, calculations and applications of methods for locating subsurface oil, gas, and mineral deposits. Field investigation using instruments with 4 hr. section.

Engineering of Mines

E.M.

102. **Mine Surveying.** SI. 3 hr. PR: Math. 15. Principles of surface and subsurface surveying, celestial observations, and related calculations together with intensive field practice in underground and surface surveying. Lectures and field work arranged.

108. **Fundamentals of Mining.** I. 4 hr. PR: Geol. 1, Math. 17, Physics 12, E.M. 102. Mineral prospecting, drilling, use of explosives, mining methods for bedded deposits and ore bodies, timbering and application of mining machinery. 4 hr. lec.

112. **Mine Plant Design.** II. 3 hr. PR: E.M. 212, T.A.M. 52 and C.E. 115 or concurrent enrollment. Applications of the principles of mechanics and mining technology to the analysis and design of mine building, head-frames, bins, skips and cages. 2 hr. lec., 3 hr. lab.

201. **Fire Control Engineering.** II. 3 to 4 hr. PR: Senior standing in an engineering curriculum or consent. The aspects involved in the control from fire, explosion and other related hazards. Protective considerations in building design and construction. Fire and explosive protection organization including fire detection and control. Lectures (3) and/or 3 hr. lab.

209. **Mineral Preparation.** II. 3 hr. PR: T.A.M. 52, C.E. 115, or consent. Principles of preparation, beneficiation, and concentration of metallic and non-metallic ores for further processing or utilization. 2 hr. lec., 3 hr. lab.

212. **Advanced Mining.** II. 3 hr. PR: E.M. 108 and PR or conc.: E.E. 105. Engineering principles, methods and equipment applied to mine transportation, hoisting, and drainage. 3 hr. lec.

213. **Mine Ventilation.** I. 3 hr. PR: E.M. 108, T.A.M. 52, and C.E. 115. Principles, purposes, methods, and equipment pertaining to the ventilation of mines. 2 hr. lec., 3 hr. lab.

215. **Industrial Safety Engineering.** I, II. 3 hr. PR: Junior standing or consent. Analysis of problems of industrial safety and accident prevention, laws pertaining to industrial safety and health, compensation plans and laws, and industrial property protection. 2 hr. lec.

217. **Coal Preparation.** I. 3 hr. PR: E.M. 108 and 209. Formation of coal, rank classification of coal, coal petrography, principles of preparing and beneficiating coal for market with laboratory devoted to sampling, screen analysis, float and sink separation, and use of various types of coal cleaning equipment. 2 hr. lec., 3 hr. lab.

218. **Advanced Mineral Preparation.** I. 3 hr. PR: E.M. 209. The theory and practice of concentration of ores and industrial minerals with special consideration to the more recent advances in the beneficiation of both ores and coal. 2 hr. lec., 3 hr. lab.

219. **Advanced Mining Methods for Vein Deposits.** II. 3 hr. PR: E.M. 108. Methods and systems of mining other than flat seams. Emphasis placed on selection of methods in relation to cohesive strength of ore bodies and their enclosing wall rocks. Mining of anthracite is included. 3 hr. lec.

220. **Mine Design.** I, II. 3 hr. PR: E.M. 212, 241. A comprehensive design problem involving underground mining developments or design of surface plant or both, as elected by the student in consultation with the instructor. A complete report on the problem is required including drawings, specifications, and cost analysis. 9 hr. lab.

222. **Mine Equipment and Machinery.** II. 3 hr. PR: E.E. 106 and E.M. 212. Selection, installation, operation, and maintenance of mining equipment. 3 hr. lec.

223. **Mine Management.** II. 3 hr. PR: Math. 18, E.M. 108, 212 and senior standing. Economic, governmental, social, and labor aspects of mining as related to the management of a mining enterprise. 3 hr. lec.

224. **Mining Engineering Problems.** I, II. 1-6 hr. PR: Senior or graduate standing or by consent. Special problems in mining engineering, including choices among operations research, mine systems analysis, coal and mineral preparation, and coal science and technology.

228. **Mine Equipment and Machinery Controls.** I. 3 hr. PR: E.M. 222 or consent. Principles, application and use of electric and hydraulic devices and circuits for protection and control of mine machinery and equipment. 3 hr. lec.

229. **Advanced Mining Equipment Applications.** II. 3 hr. PR: E.M. 228. Structural, mechanical, hydraulic and electrical characteristics of the more common items of mining equipment. Controls, electrical and hydraulic circuits, and mechanical transmissions with associated problems. Laboratory design of a control system for a mining machine. 2 hr. lec., 3 hr. lab.

241. **Mechanics of Ground Control in Mines.** I. 3 hr. PR: T.A.M. 52, Math. 18, E.M. 108 or consent. Structure of the earth's crust, bedding planes, joints,

heterogeneity, mechanical properties of rocks, stress-time-deformation relationships in rocks, theoretical stress distribution about mine openings, practical effects, factors in mine pillar design, pillar bursts, creeps and squeezes, mining subsidence. 2 hr. lec., 3 hr. lab.

247. **Explosives Engineering.** I, II. 3 hr. PR: Chem. 16, T.A.M. 51, 52. Theory and application of explosives, composition properties and characteristics of explosives reactions, effects on materials, blasting design fundamentals, legal and safety considerations. 3 hr. lec.

249. **Rock Mechanics.** I. 3 hr. PR: T.A.M. 51, 52, or consent. Elastic and plastic properties of rock, Mohr's criteria of failure, elastic theory, stress distributions around underground openings, open pit and underground stability rock testing techniques. 2 hr. lec., 1 hr. lab.

290. **Surface Mining.** II. 3 hr. PR: E.M. 108, Geol. 151, T.A.M. 52, or consent. Principles of open pit mining, quarrying and stripping with emphasis on planning, production and equipment systems. Application of the principles of mechanics to slope stability problems in rock. 3 hr. lec.

301, 302. **Advanced Mine Design.** I, II. Credit arranged. Advanced detail design and layout of coal mine plant, particularly incorporating new ideas of machines and mining methods.

Petroleum Engineering

Pet.E.

207. **Natural Gas Engineering.** I. 4 hr. PR: Pet.E. 211, C.E. 115. Principles of natural gas production, transmission, distribution processing, regulation, measurement, storage and analysis with a laboratory devoted to the principles of the equipment utilized in the above named operations. 3 hr. lec., 3 hr. lab.

210. **Drilling Engineering.** I. 3 hr. PR: Geol. 1, Math. 18, C.E. 115, I.E. 213, 281. Rock properties, wellbore hydraulics, air and gas drilling factors affecting penetration rate, slim-hole, lifting capacity liquid air or gas, two-phase flow, casing and casing string design, wellbore primary and squeezing cementing, minimum cost drilling. 3 hr. lec.

211. **Production Engineering.** II. 3 hr. PR: Pet.E. 210. Performance of productive formation, drill stem tests, completions of wells, flowing wells, gas lift methods and equipment, pumping installation design, well stimulation, emulsion, treating, gathering and storage of oil and gas, field automation. 3 hr. lec.

212. **Drilling Fluids Laboratory.** I. 1 hr. PR: Pet.E. 210, Chem. 141, C.E. 115. Drilling fluids control relative to pilot testing, drilling fluid design procedures and measurement of composition and properties. 3 hr. lab. and discussion.

216. **Petroleum Engineering Design.** II. 2-3 hr. PR: Pet.E. 234. A comprehensive problem in design involving systems in oil and gas production, field processing, transportation and storage. Two or three 3-hr. labs.

224. **Petroleum Engineering Problems.** I, II. 1-6 hr. PR: Senior or graduate standing. Investigation and detailed report on a special problem in petroleum or natural gas engineering. Supervised by a member of the graduate faculty.

233. **Elements of Petroleum Reservoir Engineering.** II. 3 hr. PR: Pet.E. 236. Introduction to the basic properties of petroleum reservoir rocks. Fluid flow through porous materials. Evaluation of oil and gas reserves. 3 hr. lec.

234. **Applied Petroleum Reservior Engineering.** I. 3 hr. PR: Pet.E. 233. Application of reservoir engineering data to the calculation of recovery potentials and to the analysis, simulation and prediction of reservoir performance under a variety of production methods to effect maximum conservation. 3 hr. lec.

235. **Formation Evaluation.** II. 3 hr. PR: Math. 17, Pet.E. 210 or consent. Principles of the various well logging methods and related calculations with exercises in interpretation of data from actual well logs. 2 hr. lec., 3 hr. lab.

236. **Mechanics of Hydrocarbon Fluids.** I. 3 hr. PR: Chem. 141. The qualitative and quantitative phase behavior of single and multicomponent hydrocarbon systems with emphasis on application to petroleum production engineering and petroleum reservoir engineering. 2 hr. lec., 3 hr. lab.

241. **Oil and Gas Property Evaluation.** II. 3 hr. PR: Pet.E. 211, 234, 235, Econ. 52. Petroleum property evaluation. Calculation of reserves and future reservoir performance, decline curves, production and formation testing, pressure transient analysis, reservoir test limit, analysis of data, curve fitting, evaluation of processing facilities and analysis of profitability. 3 hr. lec.

244. **Petroleum Reservoir Engineering Laboratory.** II. 1 hr. PR or Conc.: Pet.E. 233. Laboratory evaluation of basic and special petroleum reservoir rock properties.

300. **Hydrocarbon Production from Carbonate Rocks.** I. 3 hr. PR: Pet.E. 235, 241. Theory on the production of oil and gas from carbonate rocks, definition and classification of pore geometry, fluid flow characteristics, performance of carbonate rock reservoirs and stimulation of these reservoirs. 3 hr. lec.

301. **Advanced Petroleum and Natural Gas Engineering Design.** I, II. Credit arranged. Advanced detail design problems in some phases of petroleum and natural gas exploration, production, and transportation, particularly incorporating new ideas, machines and methods.

302. **Fluid Flow in Porous Media.** I. 3 hr. PR: Pet.E. 232, Math. 140 or consent. Intensive study of theoretical and practical aspects of the physical principles of hydrodynamics in porous media. 3 hr. lec.

340. **Secondary Recovery of Oil by Water Flooding.** II. 3 hr. PR: Pet.E. 234. Theory of immiscible fluid displacement mechanism, evaluation and economics of water flood projects, and oil field flooding techniques. 3 hr. lec.

342. **Well Stimulation: Fracturing.** I. 3 hr. PR: Pet.E. 106, 241. Theory of hydraulic fracturing, fracturing tools, fracturing fluids, fracturing orientation; propping agents and general design treatment for optimum profitability. 3 hr. lec.

343. **Advanced Secondary Recovery.** I. 3 hr. PR: Pet.E. 340. Theory and practice of secondary recovery of oil by gas flooding, miscible fluid injection, in situ combusion, and heat injection. 3 hr. lec.

351. **Thermodynamics of Reservoir Fluids. I.** 3 hr. PR: Chem. 15, 16, 141, Pet.E. 241. Determination of thermodynamic properties of single and multiphase hydrocarbon fluids. Includes processing natural gas and petroleum crudes and the fluid dynamics of processed fluids. 3 hr. lec.

352. **Substitute Liquid Fuel Processes. II.** 3 hr. PR: Pet.E. 351. Fundamentals of heat and mass transfer and systematic methods of materials and energy balances. Description of the energy conversion processes for coal gasification, retorting tar sands, oil shales, and underground natural gas. Substitute liquid fuel manufacturing processes from gaseous fuels, direct liquefaction of coal and some unconventional sources will be discussed.

362. **Reservoir Simulation and Modeling. II.** 3 hr. PR: Pet.E. 234, 302, Math. 258, I.E. 281, or consent. Solution of finite difference equations and their applications for fluid flow equations in porous media, types of grids, explicit and implicit schemes, material balance equation for oil and gas reservoirs, solution of single-phase, two-phase and three-phase flow in one, two and three dimensions, simulation of depletion drive reservoirs, gas reservoirs and other simulation methods. 3 hr. lec.

School of Physical Education

The School of Physical Education is designed and organized to study the functions of sport, dance, and human movement as they become increasingly important facets of the world in which we live.

Secondary school students who wish to become physical education students in college share a common interest. They have a strong need for and appreciation of participation in sport, dance, and physical activity, and they are interested in working with others.

The professional student should be concerned about how and in what manner sport, dance, and physical activity contribute to our total culture and the cultures of other countries of the world and what ways these areas of physical education are affected by cultures and societies. A large percentage of physical educators practice their profession in formal school systems. The college student should become intensely interested in the social and psychological learnings and physical growth and development of school children through sport, dance, and physical activity.

On a typical day the student of physical education may be exposed to such geneal curricular areas as communication skills, methods and physical education activity skills, discussions about how people learn, practice in establishing an educational environment, discovering how children grow and develop, analysis of materials and methods of conducting physical education programs, and means of evaluating the total physical education experience. Extracurricular activities include such situations as discussions with other students of physical education through club meetings about the nature of the profession and actual improvement of individual skills through active participation in sport and dance programs and campus clubs.

The physical educator who earns a bachelor's degree finds many professional opportunities open to him or her. There are immediate possibilities of teaching physical education and/or dance in schools. Exciting professional employment may be gained in the armed forces, boys' and girls' clubs, Veterans Administration, Y.M.C.A., Y.W.C.A., private athletic clubs, community and industrial recreation projects, sport writing, sport broadcasting, sport equipment production, and sport equipment marketing. Administrators of the Red Cross, Boy Scouts, Girl Scouts, and private and public camps find the competencies of the physical educator very beneficial.

The student may elect to pursue an advanced degree at both the master's and doctoral levels. The programs are designed to permit in-depth involvement through research, application, and scholarly effort in the study of sport, dance, and physical activity.

The School of Physical Education also offers undergraduate preparation leading to certification in the field of safety education. An advanced degree in safety education at both the master's and doctoral levels provides many employment outlets in industry and education.

Facilities

The facilities used by the School of Physical Education are the gymnasium, dance studio, and swimming pool located in Elizabeth Moore Hall, gymnasiums in the Field House, swimming pool in Old Mountainlair, bowling lanes in Mountainlair, outdoor areas including a golf course, tennis courts adjacent to the Field House and the Coliseum and outside playing fields adjacent to the Coliseum.

The Coliseum contains the Ray O. Duncan Memorial Library, classrooms and seminar rooms, one large gymnasium for instruction in sport skills, handball and squash courts, dance studio, adapted physical education and weight training room, safety laboratory, research laboratory and offices for the School of Physical Education staff, except for staff housed in Elizabeth Moore Hall, Field House, and Old Mountainlair.

Student Organizations

Members of the faculty serve as advisers to student organizations which include: *Physical Education Major Club,* open to all majors and minors in physical education; *Dolphin Club,* for students interested in swimming; *Orchesis,* the University dance organization; *Sigma Delta Psi,* a national honorary athletics fraternity for men; *Fencing Club,* open to all students interested in fencing; and *Folk Dance,* open to all students interested in folk dancing.

Intramural Sports

A broad intramural sports program for men and women is provided in cooperation with Student Educational Services which encourages all students at WVU to participate in organized sports and wholesome active recreation. Competition is promoted among student groups and individuals. This program is also geared to provide the physical education major with leadership opportunity.

Faculty

C. Peter Yost, Ph.D. (U. Pitt.), *Dean of the School of Physical Education and Professor of Physical Education.*

William L. Alsop, Ed.D. (WVU), *Assistant Professor of Physical Education.*

Kittie Jean Blakemore, M.S. (WVU), *Associate Professor of Physical Education.*

William A. Bonsall, M.S. (WVU), *Associate Professor of Physical Education and Gymnastics Coach.*

Robert C. Bowden, M.S. (Geo. Peabody C.), *Instructor in Physical Education and Head Football Coach.*

Jerry L. Bruner, B.S. (Fla. St. U.), *Instructor in Physical Education and Assistant Football Coach.*

Leland E. Byrd, Ed.D. (WVU), *Professor of Physical Education and Director of Intercollegiate Athletics.*

Phillip A. Callicutt, M.S. (WVU), *Instructor in Physical Education and Trainer.*

Wincie Ann Carruth, Ph.D. (NYU), *Professor of Physical Education and Chairman of Physical Education for Women.*

Frank J. Cignetti, M.Ed. (Ind. St. U., Pa.), *Instructor in Physical Education and Assistant Football Coach.*

E. Eugene Corum, M.S. (WVU), *Associate Professor of Physical Education.*

J. William Douglas, Ph.D. (Ohio St. U.), *Associate Professor of Physical Education and Chairman of Physical Education for Men.*

John Furcron, M.S. (WVU), *Instructor (part-time) in Physical Education.*
Kevin Gilson, M.A. (WVU), *Instructor in Physical Education and Swimming Coach.*
Thora M. Golz, M.A. (NYU), *Instructor (part-time) in Physical Education.*
Grace M. Griffin, A.M. (WVU), *Professor Emeritus of Physical Education.*
Albert C. Gwynne, M.S. (WVU), *Assistant Professor of Physical Education and Trainer.*
Stephen Harrick, M.A. (WVU), *Associate Professor Emeritus of Physical Education.*
George Henshaw, M.S. (WVU), *Instructor in Physical Education and Assistant Football Coach.*
Wilbur Hinebaugh, M.S. (WVU), *Instructor (part-time) in Physical Education.*
Beatrice Hurst, M.A. (Columbia U.), *Associate Professor Emeritus of Physical Education.*
Charles L. Klausing, M.Ed. (U. Pitt.), *Instructor in Physical Education and Assistant Football Coach.*
Robert L. Kurucz, Ph.D. (Ohio St. U.), *Associate Professor of Physical Education.*
Thomas Martin, B.A. (Davis & Elkins C.), *Instructor (part-time) in Physical Education.*
Charles Machock, M.S. (Akron U.), *Instructor in Physical Education and Assistant Basketball Coach.*
John C. McGrath, M.S. (Bemidji St. C.), *Instructor in Physical Education and Soccer Coach.*
Gary M. McPherson, M.Ed. (U. Va.), *Instructor in Physical Education and Assistant Basketball Coach.*
C. Everett Marcum, H.S.D. (Ind. U.), *Professor and Chairman, Department of Safety Studies.*
Richard A. Metcalf, Ed.D. (WVU), *Assistant Professor of Physical Education.*
Garland E. Moran, Jr. M.A. (WVU), *Instructor in Physical Education and Head Basketball Coach.*
George Nedeff, M.S. (WVU), *Instructor in Physical Education and Wrestling Coach.*
Gerald Oakley, M.S. (Ind. St. U.), *Instructor in Safety Studies.*
Mary Jane Pearse, M.S. (WVU), *Assistant Professor of Physical Education.*
Joseph Pendry, B.S. (WVU), *Instructor in Physical Education and Assistant Football Coach.*
Anna Marie Pizer, M.S. (Mich. St. U.), *Instructor in Physical Education.*
Dale Ramsburg, M.S. (Mich. St. U.), *Instructor in Physical Education and Baseball Coach.*
Stanley E. Romanoski, M.S. (WVU), *Instructor in Physical Education and Coach of Track Athletics.*
John Semon, M.S. (WVU), *Associate Professor of Physical Education.*
Pete Shaffron, Jr., M.S. (WVU), *Instructor in Safety Studies.*
Susan Sherman, *Instructor (part-time) in Physical Education.*
J. Edward Shockey, B.S. (King C.), *Instructor in Physical Education and Assistant to Athletic Director.*
David H. Taylor, M.S. (WVU), *Instructor in Physical Education.*
Martha Thorn, M.S. (WVU), *Instructor (part-time) in Physical Education.*
Patrick A. Tork, M.S. (WVU), *Professor Emeritus of Physical Education.*
Charity W. White, M.S. (WVU), *Associate Professor of Physical Education.*
Mary Katherine Wiedebusch, B.S. (WVU), *Assistant Professor of Physical Education.*
Bruce W. Wilmoth, M.S. (Brigham Young U.), *Assistant Professor of Physical Education.*
L. Donald Young, M.S. (WVU), *Instructor in Physical Education and Assistant Football Coach.*

Student Petitions

1. Petitions may be submitted to the Committee on Academic Standards: (a) to register for more than maximum hours regularly allowed; (b) to register for less than minimum load; (c) for reentry after academic suspension; (d) to

withdraw from courses whenever withdrawal reduces the student's hours load below the required minimum, and (e) to withdraw from a course when a student is on academic probation.

2. Petitions should be prepared on special forms and must include the recommendation of the student's adviser.

3. Barring unusual and unforeseen circumstances, a student is under obligation to complete the courses in which registration was made. Failure in a course is not a reason for withdrawal.

4. Students may appear in person before the Committee on Academic Standards to support their petitions.

5. Students may appeal decisions of their advisers and the Committee on Academic Standards to the Dean.

6. Students should submit petitions at an early date. Delay may result in denial because sufficient evidence may not be available.

General Program for Men and Women

The aims of the General Physical Education Program are to develop:

1. An appreciation of the body and its capacity to move.
2. Movement skills within the concept of games, sport, and dance.
3. An appreciation of the value of continued movement, sport, and dance throughout all age periods in an individual's life.
4. An understanding of the cultural significance of sport and dance.
5. Concepts of the physiological characteristics of sport and movement.

WVU's physical education requirements should be met in the first year of residence. Two hours of general program are required. WVU Health Service Operations will determine whether students are physically qualified to participate in the required physical education program. An individual program based on the recommendations of the health service is designed for students who are unable to participate in the regular required program because of physical handicaps.

REQUIREMENTS FOR DEGREES

The degree of Bachelor of Science in Physical Education may be conferred upon any student who: (1) satisfies the entrance requirements, (2) completes the WVU Core Curriculum requirements, (3) meets the requirements of the Professional Physical Education Program, (4) offers a minimum of 128 hours, and (5) has a cumulative grade-point average of 2.0.

Physical Education: Required Subjects

Of the 128 hours required for the Bachelor of Science in Physical Education, a minimum of 48 hours are required in the School of Physical Education.

Courses are arranged to meet WVU requirements for the Bachelor of Science in Physical Education, as well as state requirements for teacher certification. The curriculum for the four-year course has been arranged so that consideration is given to various activities which should constitute a well-rounded program of physical education for children and youth. The courses are arranged in three groups as follows:

1. Required science courses in physical education: P.E. 72, 74, 164, 165.

2. Required theory and foundations courses in physical education: P.E. 71, 121, 125, 130, 131, 154, 177, 191, 192.

3. Required sport and movement analysis courses in physical education:
   A. Area of Gymnastics—One course chosen from P.E. 51, 61, 62.
   B. Area of Aquatics—One course chosen from P.E. 52, 58, 124.
   C. Area of Individual Sports—One course chosen from P.E. 54, 64.
   D. Area of Team Sports (Women)—One course chosen from P.E. 31, 32, 63.
      Area of Team Sports (Men)—Two courses chosen from P.E. 53, 55, 56.
   E. Area of Dance (Women)—Dance 39 and one course chosen from Dance 35, 37.
      Area of Dance (Men)—Dance 39.

Recommendation for Teacher Certification

The prospective teacher who intends to apply for teacher certification in West Virginia must satisfy the requirements in physical education, education, and a second teaching field.

Teacher certification in physical education is provided for grades 1-12 or 7-12. The second teaching field must be chosen from the many and varied teaching specialization programs for elementary and secondary school teachers listed in this *Catalog* under the College of Human Resources and Education, Division of Education. The second teaching field should be selected no later than the beginning of the second year.

All students must meet the certification requirements that are in effect at their first registration in the teacher preparation program.

For teacher certification, students shall be responsible for every registration in a course. The grade-point average shall be computed on all work attempted.

School of Physical Education Course Fees

A nonrefundable course fee is required of students taking the following courses per semester in the School of Physical Education:

P.E. 1	$10.00	P.E. 42	$10.00	P.E. 164	$10.00
P.E. 2	10.00	P.E. 43	10.00	P.E. 165	10.00
P.E. 3	10.00	P.E. 51	10.00	Dance 5	10.00
P.E. 4	10.00	P.E. 52	10.00	Dance 11	10.00
P.E. 7	10.00	P.E. 53	10.00	Dance 17	10.00
P.E. 8	10.00	P.E. 54	10.00	Dance 18	10.00
P.E. 9	10.00	P.E. 55	10.00	Dance 35	10.00
P.E. 10	10.00	P.E. 56	10.00	Dance 36	10.00
P.E. 13	10.00	P.E. 58	10.00	Dance 37	10.00
P.E. 14	10.00	P.E. 61	10.00	Dance 38	10.00
P.E. 15	10.00	P.E. 62	10.00	Dance 39	10.00
P.E. 16	10.00	P.E. 63	10.00	Dance 171	10.00
P.E. 21	10.00	P.E. 64	10.00	Saf. Ed. 70	10.00
P.E. 25	10.00	P.E. 68	10.00	Saf. Ed. 131	10.00
P.E. 31	10.00	P.E. 121	10.00	Saf. Ed. 251	20.00
P.E. 32	10.00	P.E. 124	10.00	Saf. Ed. 254	20.00
P.E. 41	10.00	P.E. 125	10.00		

CURRICULUM FOR PHYSICAL EDUCATION MAJORS

Degree: Bachelor of Science in Physical Education

The curriculum for majors is organized to provide professional preparation for men and women who want to become physical education teachers in elementary schools, high schools, and colleges. The courses are arranged to meet the WVU requirements for the degree of Bachelor of Science in Physical Education, as well as the state requirements for teacher education in secondary and elementary schools. Advanced ROTC cannot be counted in the total hours toward graduation.

First Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Biol. 1	4	Biol. 2	4
English 1	3	English 2	3
Hist. 1	3	Hist. 2	3
Soc. 1	3	Art 30	3
P.E. 71	2	Soc. 51	3
Sport & Movement Analysis	2-4	Sport & Movement Analysis	2-4
	17-19		18-20

Second Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
C&I 7	2	Music 30	3
Math. 21	2	Math. 22	2
Speech Com. 11	1	Ed. Psych. 106	3
Speech Com. 12, 13 or 14	2	English 36	3
English 35	3	P.E. 74	3
Ed. Psych. 105	3	Sport & Movement Analysis	2-4
P.E. 72	3	Elective	3
Sport & Movement Analysis	2-4		
	18-20		19-21

Third Year

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
P.E. 121	3	P.E. 125	3
P.E. 130	3	P.E. 131	1
P.E. 154	3	P.E. 165	3
P.E. 164	3	P.E. 177	3
Sport & Movement Analysis	2	Sport & Movement Analysis	2-4
Health Ed. 102	2	Electives	6-9
Electives	3		
	19		18-21

Fourth Year

P.E. 191	3
P.E. 192	3
C&I 104*	4
C&I 188*	8
Electives	15
	33

*Student teaching block. Required for those students certifying to teach. May be taken the first or second semester. During the semester a student enrolls for student teaching, he may not take other courses.

COURSES OF INSTRUCTION

General Physical Education Program

The General Physical Education Program is a two-semester WVU requirement except for physical education majors and transfer students with 58 or more hours. Elementary education majors must complete P.E. 41 and 42.

The program consists of movement and sport activities. Sections are scheduled for men, women, and men and women combined.

The activities for P.E. 1 and 2, P.E. 3-42 and Dance 5-18 are listed below. Repeating an activity is not permitted unless it is at an advanced level.

P.E.

1, 2. **General Program.** I, II. 1 hr. (Selected sections of P.E. 1 and 2 are open to both men and women.) ($10.00 course fee for each P.E. 1 and P.E. 2.) Students select from the following: Adapted Physical Education; Archery; Aquatics: (Advanced Swimming, Beginning Swimming, Diving, Lifesaving, Synchronized Swimming); Badminton; Bowling; Conditioning; Dance: (Ballet, Ballroom, Folk, Jazz, Modern); Fencing; Golf; Gymnastics; Handball; Horseback Riding; Judo; Racquet Ball; Riflery; Self-Defense; Slimnastics; Tennis; Volleyball; and Yoga.

3. **Fundamentals of Physical Education.** I. 1 hr. (W). Physical self-image, principles of movement, movement patterns in sports and daily living. ($10.00 course fee.)

4. **Golf and Bowling.** I, II. 1 hr. (W). ($10.00 course fee.)

7. **Archery.** I, II. 1 hr. (W). ($10.00 course fee.)

8. **Recreational Sports.** I, II. 1 hr. (W). Badminton, table tennis, deck tennis, and shuffleboard. ($10.00 course fee.)

9. **Team Sports.** I. 1 hr. (W). Volleyball and hockey. ($10.00 course fee.)

10. **Team Sports.** II. 1 hr. (W). Basketball and softball. ($10.00 course fee.)

13. **Tennis and Bowling.** I, II. 1 hr. (W). ($10.00 course fee.)

14. **Elementary Swimming and Diving.** I, II. 1 hr. (W). ($10.00 course fee.)

15. **Intermediate Swimming and Diving.** I, II. 1 hr. (W). ($10.00 course fee.)

16. **Lifesaving and Water Safety.** II. 1 hr. (W). (Opportunity to qualify for American Red Cross Senior Lifesaving Certificate.) ($10.00 course fee.)

21. **Physical Fitness.** I, II. 1 hr. (W). ($10.00 course fee.)

25. **Fencing.** I, II. 1 hr. (W). ($10.00 course fee.)

41. **Physical Education for Elementary Teachers.** I. 1 hr. (M & W). ($10.00 course fee.)

42. **Physical Education for Elementary Teachers.** II. 1 hr. (M & W). ($10.00 course fee.)

Dance

5. **Ballroom Dance.** I, II. 1 hr. (M & W). ($10.00 course fee.)

11. **Folk Dance.** I, II. 1 hr. (M & W). ($10.00 course fee.)

17. **Elementary Modern Dance.** I, II. 1 hr. (M & W). ($10.00 course fee.)

18. **Advanced Modern Dance.** I, II. 1 hr. (M & W). ($10.00 course fee.)

Professional Preparation Courses

Dance

35. **Theory and Practice of Modern Dance Techniques.** I, II. 2 hr. Modern dance techniques and rhythmic analysis of movement patterns. ($10.00 course fee.)

36. **Movement and Its Rhythmic Structure.** II. 2 hr. PR: Dance 35. Understanding the nature and scope of rhythm. ($10.00 course fee.)

37. **Advanced Dance Techniques with Principles of Choreography.** II. 1 hr. PR: Dance 35. Concentrated study in creative movement problems. ($10.00 course fee.)

38. **Dance Composition.** II. 2 hr. PR: Dance 35, 36. Problems in force, time, and space as elements of expressive movement. ($10.00 course fee.)

39. **Folk and Ballroom Dance.** I, II. 2 hr. A study of folk, square, and ballroom dance forms. ($10.00 course fee.)

171. **Basic Rhythms and Dance Accompaniment.** II. 2 hr. PR: One semester of modern dance. Understanding of the basic principles of rhythm as they relate to body movement. (Ability to play the piano is not required.) ($10.00 course fee.)

P.E.

31. **Soccer and Track and Field.** I. 2 hr. (W). ($10.00 course fee.)

32. **Basketball and Softball.** II. 2 hr. (W). ($10.00 course fee.)

43. **Physical Education for Elementary Teachers.** I, II, S. 2 hr. PR: P.E. 41, 42, or consent. Philosophy, objectives, identification of physical education, and a broad selection of activities adapted to primary and intermediate levels. Laboratory work and observations in elementary schools required. (Required for certification for elementary school teaching certificates.) ($10.00 course fee.)

51. **Gymnastics and Volleyball.** I. 2 hr. (M). ($10.00 course fee.)

52. **Aquatics.** I, II, S. 2 hr. PR: Intermediate swimming or equiv. Exposure to swimming, diving, skin and scuba diving, synchronized and competitive techniques, small craft, water safety and pool maintenance. ($10.00 course fee.)

53. **Soccer and Wrestling.** I. 2 hr. (M). ($10.00 course fee.)

54. **Individual and Dual Sports.** I, II. 2 hr. Activities included are badminton, golf, handball and tennis. ($10.00 course fee.)

55. **Baseball and Basketball.** I. 2 hr. (M). ($10.00 course fee.)

56. **Track and Field and Football.** I, II, S. 2 hr. (M). ($10.00 course fee.)

58. **Synchronized Swimming.** I, II. 2 hr. PR: P.E. 52 or equiv. Involvement in non-competitive and competitive synchronized swimming. ($10.00 course fee.)

61. **Gymnastics.** I. 2 hr. (W). ($10.00 course fee.)

62. **Advanced Gymnastics.** II. 2 hr. PR: P.E. 51 (M); P.E. 61 (W), or equiv. A study of advanced skills and techniques in tumbling, regular and special apparatus work, and related areas of gymnastic instruction. ($10.00 course fee.)

63. **Field Hockey and Volleyball.** I. 2 hr. (W). ($10.00 course fee.)

64. **Archery, Bowling, and Fencing.** I, II. 2 hr. ($10.00 course fee.)

68. **Sport Officiating.** II. 1 hr. (W). PR: Consent. Rules, techniques, and laboratory work. ($10.00 course fee.)

71. **Orientation in Physical Education.** I. 2 hr. Introductory study of human movement and sport as related to physical education.

72. **Historical and Sociological Perspectives of Physical Education.** I, II, S. 3 hr. A study of the historical antecedents and sociological analysis of contemporary physical education.

74. **Psychological Perspectives of Physical Education.** II, S. 3 hr. PR: Psych. 1 or equiv., or one course in education psychology. An introduction to psychological principles as applied to sport performance and physical activity.

121. **Sport Injury Control and Management.** I. 3 hr. PR: Consent. A study of training, conditioning, protection, and other injury prevention measures plus first aid, emergency service, and after care related to physical education and athletics. ($10.00 course fee.)

124. **Water Safety Instructorship.** I, II. 2 hr. PR: Senior Lifesaving Certificate. Teaching methods in swimming and water safety. Meets American Red Cross certification standards. Course completion carries eligibility for teaching swimming, lifesaving, and water safety. ($10.00 course fee.)

125. **Movement Education for Children.** I, II, S. 3 hr. A study of movement education and its relationship to activities included in elementary physical education. ($10.00 course fee.)

130. **Methods of Teaching Physical Education.** I, II. 3 hr. PR: Six hours in Sport and Movement Analysis and Ed. Psych. 105. (Cross listed C&I 174.) A survey of communication skills involved in teaching. Emphasizes teaching techniques and methodology.

131. **Program Assisting.** I, II. 1 hr. PR: P.E. 130.

154. **Sport Coaching.** I, II, S. 3 hr. PR: Four courses in Sport and Movement Analysis, or consent. Designed to prepare students for athletic coaching.

164. **Kinesiology.** I, II, S. 3 hr. PR: Junior standing. Anatomical, mechanical, and musculoskeletal study of the human body as the instrument for efficient performance of motor activities. ($10.00 course fee.)

165. **Physiology of Motor Activities.** II, S. 3 hr. PR: Junior standing. A study of human functions under the stress of motor activity. ($10.00 course fee.)

176. **The Adapted Program in Physical Education.** II. 2 hr. PR: P.E. 164 or consent. Devoted to organizing and adapting physical education programs to meet the needs of atypical students.

177. **Philosophy and Principles of Physical Education.** I, II, S. 3 hr. PR: Junior standing. Relationship of basic tenets of educational philosophy to physical education and the application of scientifically formulated principles of physical education to practical problems.

191. **Measurement and Evaluation in Physical Education.** I, II, S. 3 hr. PR: Junior standing. A study of measurement devices and evaluation techniques employed by physical educators. Emphasis on criteria for test construction and selection,

pertinent standardized tests, and the use of statistical models for evaluating test data.

192. **Organization and Administration of Physical Education.** I, II, S. 3 hr. PR: Junior standing. (Cross listed with C&I 279.) Analysis of administrative and organizational principles and processes relating to physical education.

199. **Seminar in Physical Education.** I, II. 3 hr. PR: Junior standing. A study and discussion of problems and issues in physical education.

300. **Workshop in Physical Education.** I, II, S. 1-15 hr.

305. **Philosophical Concepts in Physical Education.** I, S. 3 hr. PR: Graduate standing or consent. Study of educational philosophies and application of these philosophies to physical education; study of the place of physical education in education and modern living.

306. **Scientific Interpretations of Physical Education.** I. 3 hr. PR: Doctoral standing. A synthesis of the behavioral and biological sciences as a foundation for advanced study in the disciplinary content of sport science and physical education.

320. **Individual Interaction in Sport and Physical Activity.** I, S. 3 hr. PR: Graduate standing or consent. Designed to acquaint the student with the reciprocal relationships between sport and physical activity and the societies and cultures out of which sport emerges. In-depth analysis of the study of sport utilizing sociological investigatory methods as frames of reference.

340. **Psychology of Sport and Physical Activity.** I, S. 3 hr. PR: Graduate standing or consent. Study of the psychological effects and implications of man's participation in sport and physical activity. Emphasis on psychological and learning theory, personality, and performance in physical activity.

345. **Group Influences in Sports.** I. 3 hr. PR: Research, Statistics, P.E. 320, 340. The content of this course is concentrated upon the manner and degree to which selected psychological processes of individuals are affected by involvement in sports.

360. **Biomechanical Analysis of Sport and Physical Activity.** II, S. 3 hr. PR: Human Anatomy and Physiology, Physics, and Kinesiology. Advanced principles of body mechanics and analysis of muscle and joint actions in coordinated movement and neuromuscular physiology.

365. **Psychomotor Behavior Analysis.** II, S. 3 hr. PR: Doctoral standing. In-depth study of psychomotor learning with emphasis on behavioral change in physical activity. Review of research and psychological thought pertinent to motor learning personality, performance, and physical activity.

367. **Theories of Sport Physiology.** I, S. 3 hr. PR: Doctoral standing. Thorough and workable knowledge of principles involved in the interactions of muscles and nerves, reflexes, metabolism, cardiopulmonary function, environmental physiology and the practical application of work physiology.

380. **History of Sport and Physical Activity.** II, S. 3 hr. PR: Graduate standing or consent. Anthropological and historical approach toward the influence of events, political and social climates, and personalities upon the sport cultures from early civilizations to the present.

Safety

70. **First Aid and Emergency Allied Services.** I, II, S. 2 hr. Introductory aspects of emergency care provided for sick and injured, emphasizing principles and concepts for dealing intelligently with emergencies which might cause permanent disability or threats to life as well as pain, damage, or suffering of less serious nature. ($10.00 course fee.)

131. **Accident Prevention and Control Principles.** I, II, S. 2 hr. Basic course which structures principles, concepts, and methodology of the safety movement into introductory experiences dealing with accident prevention and control efforts recommended for various social institutions and agencies. ($10.00 course fee.)

231. **Safety in Motor Transportation Services.** I, S. 3 hr. PR: Safety 300, 310, or consent. Considers safety elements of automotive and other forms of transportation equipment, design, and control plus legislation and planning at federal, state, and local levels for improved safety features of transportation systems.

233. **Disaster Preparedness and Emergency Systems.** I, S. 3 hr. PR: Consent. Study of major elements involved in disasters and emergencies, preparedness planning, systems utilization, and attention to essential human services, with emphasis on community action.

251. **Driver and Highway Safety Fundamentals.** II, S. 3 hr. PR: Safety 131. Basic course for individuals who plan to teach courses to beginning drivers. Emphasizes essential content, methods, and desirable practice for both classroom and laboratory applications. ($20.00 course fee.)

254. **Teaching Driver and Highway Safety.** S. 3 hr. PR: Safety 251 or equiv. and valid driver license. Major aspects of teaching and coordinating driver and highway safety education including emphasis on curriculum construction, evaluation, marking, and administration. Arranged laboratory assures practice in providing behind-the-wheel instruction to beginning drivers. ($20.00 course fee.)

255. **Current Safety Topics and Problems.** I, S. 3 hr. PR: Advanced graduate major in Safety or consent. Consideration of current and persistent problems in the field of safety in general and the component area of safety and traffic education. Seminar emphasis also extends attention to safety problems and issues of concern to participating class members.

300. **Philosophical Concepts in Safety.** I, S. 3 hr. Philosophies of the safety movement as expressed by leaders in the field are related to accident causation, accident prevention, and research implications. Emphasis on the relationships of environmental safety, safety services, and safety instruction to the major safety problems of modern living.

310. **Environmental Aspects of Hazard Control.** I, S. 3 hr. PR: Safety 300 or consent. An investigation of hazard control principles relating to environmental objects, facilities and equipment and control procedures recommended by authorities from the fields of engineering, medicine, and public health as well as from the field of safety.

311. **Human Factors in Accident Prevention.** II, S. 3 hr. PR: Safety 300 or consent. Investigation of concepts dealing with human behavior as related to accident experience in major reporting categories with consideration of psychological and sociological implications as well as motivational problems.

336. **Occupational Safety Program Management.** II, S. 3 hr. PR: Safety 300 or consent. Management guidelines, personnel techniques, and operational features applicable to safety programs designed for business, government, and industrial organizations.

337. **Personal and Environmental Safety Supervision.** II, S. 3 hr. PR: Safety 300 or consent. Supervisory methods, tools, and techniques designed to develop safety leadership qualities, to promote human relations, and to motivate employee responsibility for safe living practices.

351. **Safety Education Principles and Content.** II, S. 3 hr. PR: Consent. Study and analysis of content areas usually recommended for instructional programs within the field of safety, with emphasis on promotion of safe living practices.

356. **School and College Safety Administration.** II, S. 3 hr. PR: Graduate major in Safety or consent. Current emphasis in administering and supervising safety education, safety services, and environmental safety at various program levels from elementary school through college. Relationships between elements of various programs are stressed.

School of Social Work

FACULTY

Leon H. Ginsberg, Ph.D. (U. Okla.), *Professor and Dean of the School of Social Work.*
C. Steve Adams, M.S.W. (Ind. U.), *Instructor.*
Betty L. Baer, M.S.S. (Syracuse U.), *Associate Professor.*
Marjorie H. Buckholz, Ph.D. (NYU), *Professor.*
Janice W. Cone, M.S.W. (U. Denver), *Instructor, Behavioral Medicine and Psychiatry.*
C. Courtney Elliott, M.S.W. (Tulane U.), *Assistant Professor.*
Phyllis T. Elliott, M.S.W. (Tulane U.), *Instructor.*
Helen S. Ellison, M.S.W. (Columbia U.), *Associate Professor.*
B. Paul Enoch, M.S.W. (WVU), *Assistant Professor.*
Priscilla J. Herbison, M.S.W. (U. Ill.), *Assistant Professor.*
Jon S. Hunter, M.S.W. (U. Wisc.), *Visiting Associate Professor.*
John F. Isaacson, M.S.W. (U. Penn.), *Associate Professor.*
Robert A. Jones, M.S.W. (WVU), *Adjunct Instructor.*
Patricia M. Keith, A.M. (U. Chicago), *Instructor.*
Elizabeth Lewis, Ph.D. (Case Western Res. U.), *Visiting Associate Professor.*
Barry L. Locke, M.S.W. (Va. Commonwealth U.), *Adjunct Instructor.*
Donald G. Magel, M.S.W. (U. Calif.), *Assistant Professor.*
John J. Miller, Ed.D. (WVU), *Associate Professor.*
Caroline T. Mudd, M.S.W. (U. Penn.), *Associate Professor.*
Virginia B. Myers, M.S.W. (WVU), *Instructor.*
Willis J. Nordlund, Ph.D. (U. Utah), *Assistant Professor.*
Patricia Porterfield, M.S.W. (WVU), *Instructor and Acting Chief of Behavioral Medicine and Psychiatry.*
Robert B. Porter, Ph.D. (Brandeis U.), *Professor.*
Daniel Rubenstein, Ph.D. (Brandeis U.), *Associate Professor.*
Victor L. Schneider, Ph.D. (U. Mich.), *Professor.*
Leroy G. Schultz, M.S.W. (Wash. U.), *Associate Professor.*
Neil R. Snyder, M.S.W. (U. Pitt.), *Assistant Professor.*
Ellen F. Starkey, M.S.W. (WVU), *Instructor, Behavioral Medicine and Psychiatry.*
Josephine H. Stewart, M.S.W. (U. Pitt.), *Instructor.*
Gary L. Theilen, M.S.W. (U. Okla.), *Assistant Professor.*
Harold R. White, M.S.S. (SUNY, Buffalo), *Associate Professor.*
Leon F. Williams, M.S.W. (WVU), *Assistant Professor.*

Adjunct Instructors

Charles S. Adams, M.S.W. (Ind. U.).
Antoinette H. Arkle, M.S.W. (WVU).
Richard S. Bachman, M.A. (Ohio St. U.).
Baron E. Carson, M.S.W. (WVU).
Walter A. Case, M.S.W. (WVU).
Eloise H. Crim, M.S.S.A. (Richmond Prof. Inst.).
Eric J. Cutlipp, M.S.W. (WVU).
Karen V. Harper, M.S.W. (WVU).
Joseph M. Havrilla, Jr., M.S.W. (WVU).
Beatrice B. Hunter, M.S.W. (WVU).
Alfred W. Jacobs, Jr., M.S.W. (WVU).
John H. Johnson, Jr., M.S.W. (WVU).
John R. Klenowski, M.S.W. (WVU).
Arlen D. Miller, M.S.W. (Ohio St. U.).

Joseph K. Mullen, M.S.W. (WVU).
Richard M. Ney, M.S.W. (Loyola U.).
Charles J. O'Hargan, M.S.W. (U. Pitt.).
Florence Porter, M.S.S.W. (U. Denver).
Geraldine Salisbury, M.S.W. (WVU).
William D. Stamaton, M.S.W. (U. Wisc.).
Gerald W. Vest, M.S.W. (U. Conn.).
John R. Williams, M.S.S.S. (Boston U.).
Virginia I. Wilson, M.S.W. (Ohio St. U.).
John A. Yankey, Ph.D. (U. Pitt.).
Betty J. Veach, M.S.W. (WVU).

UNDERGRADUATE PROGRAM

The School of Social Work offers an undergraduate program designed to provide the student with a basic knowledge of social welfare as a system of social institutions which has been developed to meet human needs. The program is intended to provide practitioners who will serve the state and region.

In 1960 the myth of the "happy hillbilly" was exploded; the happy, ignorant, but proud hillbilly of legend was re-examined and there emerged the spectre of poverty in all its dimensions. Now we know that the Appalachian region is not populated with the likes of Snuffy and Loweezy, and that Snuffy, far from being the beloved little character who abhors work and "revenooers," may well be the victim of insidious malnutrition which stunts growth, limits intellect, and drains creative energy.

The citizens of Dogpatch are no longer seen as mischievous and delightful but as products of a cruel system, caught in a web of poverty and despair which has assigned thousands to the welfare dole and forced many to flee into the region's urban ghettos. The happy hillbilly has been replaced by gaunt faced, despairing men who have been automated out of the only work they knew. The faces are seen in the hollows, the small towns and in the midst of the urban sprawls of Pittsburgh, Cincinnati, Chattanooga, Baltimore, and Cleveland, to name a few.

The School of Social Work at WVU, which also offers a master's degree, is attempting to energize a people, to create opportunities for youth, and to ease the burden of the poor in the region by educating a cadre of people who "care." Such people are needed for work in hollows, small towns, and cities of the Appalachian region to help roll back the plague of our economic excesses. We believe the "action" is here and those who choose to work here can find rewarding careers as advocates for the "invisible" poor.

Since 1960 many shortages have been documented about the region but the most glaring has been its loss of bright, competent youth who may be its future leaders. There are opportunities for employment in West Virginia and the region in such areas as: individual treatment, group experiences, community organization; in such settings as: child and public welfare departments, the courts, family counseling agencies, mental health programs, community action agencies, settlement houses, and in juvenile treatment centers.

The demand for bachelor's level social workers has been great in most settings where people need help with their problems. The bachelor's level worker traditionally performs the "line" duties, providing direct services to

those who have need of them and is at times the client's only knowledge of someone who cares in a given community. West Virginia, specifically, and Appalachia in general, has a critical shortage of qualified, well-trained human service personnel, people who care about *human* renewal and want to get involved. It is this challenge that the School of Social Work offers its students.

Contemporary American social welfare programs are integrally related to our history and to current social and political changes. Social welfare services are of such significance that every educated citizen should have some knowledge of their origins, philosophy, and structure, as well as some appreciation of the range of professional disciplines and skills utilized in carrying them out. This basic knowledge is offered in a core of 15 semester hours of upper-division social work courses which have the following specific objectives:

1. To assist the student in understanding social welfare as a system of social institutions within the context of social change and shifting values in a democratic society.
2. To assist the student in developing a capacity for critical assessment of the significance of changes in social welfare policies and programs which affect human well being in the American society and elsewhere.
3. To assist the student in the integration of other knowledge, drawn from his academic studies and life experiences, into a personal philosophy regarding the rights and responsibilities of the individual in American society.
4. To assist the student in acquiring the basic knowledge and skills which are important for beginning social work practice.

The social work major is for students who are concerned about social issues, who wish an individualized, interdisciplinary course of study which is concerned with the development of human service skills, and who wish to pursue careers in the human services.

The undergraduate social work major is approved by the Council on Social Work Education and is accepted, on completion of requirements for the B.S. degree, by the National Association of Social Workers for entry into regular membership in the Association. The program prepares for social work practice at the beginning professional level. Students who complete this program with a 3.0 average are admitted to the Master of Social Work program at WVU with advanced standing.

The undergraduate social work major is intended to prepare students with a generic core of knowledge and skill, as defined by the profession, to work in the state and region.

Admission Requirements

Students will be admitted to the social work program only after having completed 58 hours of WVU course work including S.W. 51 with an average of 2.0 or higher. No foreign language is required. Within these guidelines, students will be admitted in order of their request up to the number which can be accommodated in the various courses.

Students may take a waiver exam for S.W. 51 if special circumstances warrent it, i.e. transfer students. Only transfer students may take S.W. 51 concurrently with S.W. 200.

Requirements for the Degree

A major in social work consists of 15 hours of upper-division courses in social work, 15-21 hours of upper-division work in a selected area of minor study, and a minimum of 24 hours of additional upper-division course work in arts and sciences, or elsewhere in the University with consent of adviser, selected by the student from a group of recommended electives.

University Core Curriculum	
English Composition	6
Physical Education	2
Core Group A	12
Core Group B	12
Core Group C	12
	44
Social Work Courses	
Lower Division	3
Upper Division	15
	18
Area of Minor Study	15-21
Recommended Upper-Division Arts and Sciences Courses	24
	45
(Upper division courses elsewhere in the University may be substituted with the advice and consent of the adviser.)	
Electives*	21
Total	128

*At least 9-12 hours of the electives will be utilized on the lower division for students to secure foundation content in the social science area beyond the core curriculum requirements.

No foreign language is required. Students are urged to consult with their advisers regarding choice of electives.

To establish a major sequence and to qualify for graduation, the student must have spent at least two semesters and have accumulated a minimum of 30 semester hours as an upper-division student in the department of his major, or under its guidance.

The student who wishes to major in Social Work should contact the Social Work office in Allen Hall for assistance in planning and for additional information. Freshmen and sophomores who are considering social work as a major should consult the College of Arts and Sciences Academic Advising Center pre-social work advisers for help in planning their programs.

Social Work

S.W.

51. **Introduction to Social Work.** 3 hr. Introductory course to social work and other helping professions, having the objective of providing services to individuals, groups, families, and communities. Role of the helper and the kinds of problems and situations with which the helper may become involved are explored. Appropriate for all students interested in a career in the helping professions. (Open to sophomores.)

200. **Social Welfare Policy and Services.** 3 hr. PR: S.W. 51 or consent. Introduction to the institution of American social welfare. Content contributes to the student's knowledge of the history, philosophy, objectives, and organization of social welfare polices and services in the United States.

210. **Social Welfare Policy and Services in Appalachia.** 3 hr. PR: S.W. 200 or consent. Study of the organization of social welfare services in the state and region. Consideration of social, cultural, economic, and political factors influencing the current system of social welfare policies and services.

220. **Social Work Methods I.** 3 hr. PR: S.W. 200 or consent. Theories and concepts of intervention, including prevention and rehabilitation with individuals, families, small groups, and communities. Students examine problem areas of concern to social work. Emphasis on students learning beginning skills in interviewing, observation, recording, problem identification, and analysis. Field experience is an essential part of the course. (Open to social work majors only.)

221. **Field Experience in Social Work.** 3 hr. PR: S.W. 220. Emphasizes the development of basic helping skills through a supervised field experience in a community agency or program. Students spend a minimum of three hours weekly for each hour of credit in the supervised field experience. All students in field experience meet in planned seminars with a faculty instructor. (Open to social work majors only.)

222. **Social Work Methods II.** 3 hr. PR: S.W. 221. Utilization of student learning to help students examine and analyze a variety of approaches to intervention, prevention, and rehabilitation. Such approaches in current programs as community action, model cities, comprehensive community mental health, organized population groups, services of departments of public welfare, extension, and others are examined. Field experience is an essential part of the course.

280. **Seminar.** 1-6 hr. PR: Consent. Current issues in social work. Independent study with weekly seminar. (Students should inquire at the Social Work office for current offerings. Some offerings are open to all upper-division and graduate students.)

Continuing Education Courses

The School of Social Work provides a series of 300-level courses which are designed for professionals employed in health, education, and welfare agencies and services. Such courses are given both on campus and in extension.

300. **Public Welfare.** 3 hr. An introductory course which examines the broad range of social welfare services, both public and private, with a critical analysis of the development of health and welfare programs alongside of contemporary problems and issues. Course is of interest to those who regularly work with individuals and families that make use of, or rely upon welfare services, such as teachers, social caseworkers, counselors, and public health nurses.

305. **Child Welfare.** 3 hr. Childcare in the seventies. Focus is on changing nature and function of the family; alternatives to traditional family care in meeting the needs of children will be considered. Services to children such as the public school, the alternative school, day care, public welfare and family assistance plans as they support and supplement family care will be considered along with services to meet special problems. Course intended for school teachers, public health nurses, social workers, school attendance workers, and others working with children and their families.

307. **Introduction to Social Casework I.** 3 hr. Basic principles of caseworker as a process of social interaction and intervention with problem-solving as an inherent goal. Special attention towards increasing skills in interviewing, observation, assessment of problems, and in setting appropriate and constructive goals. Course is of interest to those working in fields of mental illness, alcoholism poverty, health, remedial education, and rehabilitation.

308. **Introduction to Social Casework II.** 3 hr. PR: S.W. 307 or equiv. Utilization of basic casework method as a foundation for development of skills in providing services to groups of individuals, families, and community. Theories and concepts of intervention, prevention, and rehabilitation within the broad range of skill and knowledge requirements for contemporary practice in health, education, and welfare services. Of interest to those who work with small groups of children or adults.

310. **Introduction to Human Behavior I.** 3 hr. Study of behavior as basically learned responses acquired from social situations and experiences. Individual and group behavioral norms from varying and diverse socio-cultural environments are examined within the framework of common social institutions—the family, neighborhood, and social mobility groups, schools, vocational settings, etc. Of interest to social workers, employment counselors, teachers, rehabilitation, poverty, and community mental health workers.

311. **Introduction to Human Behavior II.** 3 hr. PR: S.W. 310 or equiv. Further study of psychosocial and cultural determinants designed to increase knowledge and understanding of individual and group behavior through an analysis of social organizations with a special focus on the impact of deprivation from various sources and causes. Independent or group projects are encouraged. Of interest to social workers, employment counselors, teachers, rehabilitation, poverty, and community mental health workers.

Part 4
INTERDEPARTMENTAL PROGRAMS

Committee on African Studies

Since the early part of 1967, the University has expanded its technical and academic competence regarding Africa from solely the agricultural sciences to include the social sciences and humanities. Presently, several units of the Colleges of Arts and Sciences, Business and Economics, Human Resources and Education, and the Creative Arts Center, are actively engaged in the teaching and research of African and Africa-related subjects. New faculty are regularly added to complement African studies, and the University is sponsoring serious African research and curriculum development within the arts, sciences, and humanities, as well as within agriculture.

WVU has gained experience in developing a rapport with foreign students —African and others. Over seventy-five students from Africa have earned certificates, diplomas, and degrees in formal subject areas at the University; and increasing numbers are enrolling every year. More than two hundred short-term participants have engaged in studies and other activities at WVU.

The Committee on African Studies was formally organized in 1969 to fulfill two basic requirements: (1) to blend the agricultural expertise of long-standing with the newer programs of study and research into a unified whole of course offerings and systematic research; and (2) to make available the knowledge present in the social sciences and arts concerning Africa to existing and prospective University programs of African technical assistance.

Moreover, it is within the Committee's mandate to broaden its activities to include other parts of the world experiencing problems of development and human change similar to those of Africa. Although the University's assistance, instructional, and research have been related primarily to East Africa, they do have a wider application. The concepts and philosophy developed in all of these activities have utility throughout Africa and, with suitable modification, should be of benefit to other developing areas of the world, including the Appalachian region.

Academic Goals of the Committee

Instructional Goals

In their broadest immediate sense, the instructional goals of the Committee are: (1) to provide for WVU an interdisciplinary competence in the teaching of the complex human and technological aspects of African development; and (2) to secure and maintain the procedural means for students in many fields readily to avail themselves of these interdisciplinary African and development studies.

Research Goals

The research goals of the Committee are: (1) to provide interdisciplinary means through which significant contributions to the advancement of knowl-

edge in African and development studies can be made by University faculty; and (2) to provide the opportunity for undergraduate and graduate students to pursue investigations, including field research, which will benefit greatly their learning experiences at WVU.

The Africana Library Collection

For several years, the University Library has accumulated African materials in a variety of disciplines; so that presently the Africana collection contains more than 6,000 volumes, exclusive of periodicals, and is capable of supporting undergraduate and graduate research up to and including the doctoral level within several natural and social sciences.

Academic Programs of the Committee

Degree Programs

The Committee does not offer either undergraduate or graduate degrees in African studies as such; but rather stimulates the interdisciplinary study of Africa and development on the part of students who are formally associated with departments in the natural and social sciences and humanities.

In 1970, the WVU Public Administration Program was expanded to include an option in development administration. In effect, the offering of this option allies the Committee on African Studies and its curriculum with the Public Administration Program. Graduates completing the option are awarded the Master of Public Administration degree, with an interdisciplinary concentration in the area of African and development studies.

Special Academic Programs and International Study

The Committee provides opportunities for special non-degree study in Africa-related subjects at the University, as currently sponsored by the Office of International Programs; and is working to develop international study programs within Africa for University faculty and students.

African Speakers Program

For five years, the University has sponsored speakers on Africa to come and speak before University audiences. This program will be continued and expanded by the Committee on African Studies.

Further information concerning the Committee and its program can be obtained from:

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Office of International Programs
212 Agricultural Sciences Building

Rodger Yeager
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African and Related Undergraduate Courses of Study

College of Agriculture and Forestry

Agr. 190—Man and Food.

Faculty of Agricultural Biochemistry

Agr. Biochem. 320—Special Topics.

Division of Resource Management

Agr. Economics 213—Economic Development.
Agr. Education 320—Special Topics.

College of Arts and Sciences

Department of English

English 185—Introduction to Contemporary African Literature.
English 286—Black American Fiction.

Department of Foreign Languages

Swahili 1, 2—Elementary Swahili.
Swahili 3, 4—Intermediate Swahili.

Department of Geology and Geography

Geogr. 246—Geography of Africa.

Department of History

Hist. 229—History of Africa: Pre-Colonial Africa.
Hist. 230—History of Africa: European Dominance and Independence.
Hist. 251 and 252—History of Black People in America to 1900 and Since 1900.

Department of Political Science

Pol. Sci 258—Politics of Africa.
Pol. Sci. 290—Socio-Politics of Africa.
Pol. Sci. 295—Politics of Planned Development.
Pol. Sci. 391—Leadership and Authority in Africa.
Pol. Sci. 394—Theory of Political Development.

Department of Sociology

Sociol. 131—Urban Sociology.
Sociol. 142—Sociology of Economic Life.
Sociol. 156—African Society and Culture.
Sociol. 190—Man and Food. (Same as Agr. 190.)
Sociol. 205—Social Stratification.
Sociol. 223—Sociology of Rural Life.
Sociol. 240—Social Change.
Sociol. 241—Population and Migrations.
Sociol. 251—Cutural Dynamics.
Sociol. 253—Cross-Cultural Studies in Development.
Sociol. 281—African Society and Culture.
Sociol. 290—Special Topics in Anthropology.

Department of Speech Communication

Speech Com. 175—Rhetoric of the Black Movement.

College of Business and Economics

Econ. 210—Comparative Economic Systems.
Econ. 213—Economic Development. (Same as Agr. Econ. 213.)
Econ. 219—Seminar in Economics.
Econ. 375—Economic Development.
Econ. 379—Seminar in Economic Development.

Creative Arts Center

Division of Music

Music 230—Music of Africa.

College of Human Resources and Education

Division of Education

Curriculum and Instruction 270—Special Problems in Comparative Education.

Appalachian Center

The pioneers in the land-grant movement intended to establish institutions through which knowledge and learning would become an effective part of the daily lives of the American people. West Virginia University is such an institution.

The Appalachian Center serves, both on and off campus, as (1) a crossroads for social, cultural, and economic planning; (2) to help mobilize the many special efforts of private and public agencies; (3) to extend and to organize the available resources of WVU so as to provide lifelong educational opportunities for more and more people; (4) to assist young people through youth development programs to realize their potential; and (5) to develop, gather, index and disseminate knowledge.

The Center emphasizes the sharing of knowledge and providing insights about processes and systems of decision-making so that public and private leaders may make better-informed choices in individual, family, community programs centered on community, area, and statewide problems.

Field offices in each of the state's fifty-five counties and six area offices are integral parts of the Center and the University. The University Extension Offices—staffed with University Extension Agents—assist agencies and organizations to carry out programs which support statewide development goals.

The work of the Appalachian Center is organized around four basic concerns of man: (1) man and his means (economic development); (2) man and himself and his family (human development); (3) man and his work; and (4) man and his environment, which includes not only the physical environment in which he lives and works, but the institutional environment of government and other public services.

Division of Social and Economic Development

The Division of Social and Economic Development is responsible for research and educational programs which provide information to support higher educational activities intended to further the continuing improvement of social and economic activities in West Virginia. It has special responsibility, through its Office of Research and Development, for the design and conduct of applied interdisciplinary research projects which stimulate the development of new or modified University extension programs, as well as providing research and evaluation of existing Extension programs relevant to the state's social and economic problems.

Included in the division is the Water Research Institute. The Institute's program is designed to obtain knowledge needed to gain the greatest benefit from the water resources in West Virginia. The Institute is funded under the Federal Water Research Act of 1964.

Another program in the division is the Continuing Business Extension Program, which is offered jointly with the College of Business and Economics. This program offers educational opportunities to the state's middle- and smaller-sized business leaders which promise to help them in their work.

Division of Manpower and Labor Studies

The educational and research activities of the Division of Manpower and Labor Studies are designed to meet the needs and interests of West Virginia's non-agricultural work force. Programs of the division—offered throughout the state—include non-credit short courses, conferences, seminars, and related research.

The division encompasses Fire Service Extension; Industrial Extension; Institute for Labor Studies; Mining Extension and Manpower Development.

Training for West Virginia's fire fighters is offered by Fire Service Extension. The fundamentals of fire fighting are taught in basic, advanced, and regional schools conducted throughout the state. A training center located in Morgantown offers facilities for live fire-training and fire-extinguishment research.

Industrial Extension programs include the nationally recognized Underground Corrosion, Gas Measurement and Gas Compression courses. These one-week schools bring several hundred industry technicians and engineers to the WVU campus each year.

Mining Extension provides workers an opportunity to acquire the specialized knowledge required of miners, mine mechanics, and mine supervisors. The curriculum includes such courses as ventilation, gas detection, mining law, mining mathematics, safety and general mining practices, mine equipment maintenance, mine surveying, and coal preparation. The Mining and Industrial Extension programs are offered as cooperative efforts of the Appalachian Center and the School of Mines.

The Institute for Labor Studies conducts educational and research programs of interest to workers and their organizations. Subject matter ranges from skill courses, e.g. steward training, collective bargaining, work measurement, union administration, job evaluation, and contract administration, on the one hand, to a liberal arts curriculum covering such subjects as labor and the economy, labor and government, labor and society, and labor history. Research work ranges from collective bargaining studies, to attitude surveys, to economic analysis.

Division of Personal and Family Development

The goal of the Division of Personal and Family Development is optimum human development—the realization of self in society. Programs focus on a quality of living emphasis designed to educate for living. To this end, programs are person-centered with a total approach encompassing the individual's ability and skill in decision-making, interpersonal relations, effectiveness of community participation, and development by the individual of a basic set of beliefs and values which give meaning to life.

The division's work is conducted through six program units; (1) 4-H Programs for Youth, (2) Extension Education Programs for Women, (3) Expanded Food and Nutrition Program, (4) Clergy Education, (5) Cultural Arts, and (6) Behavioral Studies.

Division of Environmental Development

Educational programs of this division include community and rural development, environmental improvement and maintenance, outdoor recreation, tourism, housing, and emergency preparedness.

Community and rural development focuses on improving the decision-making capabilities of community groups, organizations, agencies, and public officials; improving community facilities and services; facilitating social and economic development; and identification of and the effective use of resources.

Environmental improvement comprises educational programs designed to maintain an acceptable level of air quality, ample and clean water, solid waste management, and a continuing information effort.

Outdoor recreation and tourism programs consist of nature study, field trips, recreational activities, recreational facilities and management (public and private), and creating an environment that will encourage tourist development.

Housing activities focus on the coordination of housing interests toward achieving a greater beneficial impact, providing information on current interests, and assisting groups and institutions to improve their delivery systems.

Emergency preparedness efforts involve educational programs designed to create an awareness and know-how in handling a variety of emergency situations in event of a natural or man-made disaster.

Opportunities exist for undergraduate and graduate students to support local program activities in a variety of subject matter areas.

Agriculture and Forestry Extension

The Agriculture and Forestry Extension programs, carried out in cooperation with the College of Agriculture and Forestry, have been in continuous operation in West Virginia since 1913. The primary objective is to collect, translate, and diffuse knowledge that has been generated by the College of Agriculture and Forestry and other similar institutions and organizations.

Programs concern agronomy, agricultural economics and farm management, agricultural engineering, forestry, horticulture, livestock, dairy, poultry, and plant pathology and entomology.

Division of Information and Education Technology

The Division of Information and Education Technology assists staff members of the Appalachian Center to develop and use teaching materials which utilize the advances that have been made in educational technology. The division also is involved with the preparation of subject matter and public affairs programming for radio, television, newspapers, and publications.

Division of Extension Credit

Extension courses must be approved by the respective Department Chairman, Academic Dean, and the Director of Extension Credit and Non-Credit Programs. In addition, graduate-level courses must be approved by the Graduate School Dean. Students taking extension courses for credit must satisfy

all requirements for admission to the University and, before registering, must file with the WVU Dean of Admissions and Records complete official transcripts of record.

The maximum undergraduate extension credit that will be accepted toward a WVU degree is 48 hours, provided the courses fit the curriculum for the degree chosen. Generally, a student may earn up to 28 hours of undergraduate extension credit in teacher education curricula. The maximum undergraduate credit that may be counted toward a degree for extension work taken in other institutions is 30 semester hours. No more than 15 hours of work taken in graduate extension courses may be counted toward any degree, and of these only 9 semester hours may be in one field. Education majors are limited to 15 semester hours that may be counted toward the completion of the master's degree. No more than 9 of these hours can be taken in extension prior to earning 6 hours in Education in residence at WVU. For other regulations on graduate extension for Education majors, see the College of Human Resources and Education section of the *Graduate Catalog*.

Library and laboratory facilities for each course must be approved by the Director of the Division of Extension Credit and Non-Credit Programs and, in case of courses for graduate credit, by the Graduate School Dean. Books for use by extension students may be borrowed from the University Library upon the order of the Director of Extension Credit, subject to the approval of the Library Committee. Postal charges must be paid by the individual or groups for whom the books are borrowed.

A fee of $14.00 per semester hour and a $20.00 off-campus enrollment fee are charged for each extension graduate course offered.

Recognizing the importance of continuing education, WVU has adopted the Uniform Measurement System recommended by a national task force coordinated by the National University Education Association (NUEA). The Continuing Education Unit (C. E. Unit) may be used for the measurement, recording, reporting, accumulation, transfer and recognition of participation by adults in programs which seldom in the past have been recorded in a systematic way or with any sense of permanence, significance, or transferability. The unit can be applied with equal facility to professional continuing education, vocational retraining, and adult liberal education as well as all other programs in adult and continuing education. The assignment of C. E. Units to a WVU-sponsored educational activity is the responsibility of the Director of Extension Credit and Non-Credit Programs.

For further information write to the Director of Extension Credit, West Virginia University, Morgantown 26506.

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